

MECHANICAL HANDLING

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AN EVEN GREATER SUCCESS

WITHOUT any undue boasting, it can be claimed that the seventh Mechanical Handling Exhibition (recently concluded) organized by this journal was an even greater success than its predecessors. The exhibitors report that they had an excellent exhibition and the many visitors to whom we spoke had nothing but praise for the wonderful arrangement of equipment displayed and the help offered to them by the personnel on the stands.

This bi-annual exhibition has become a very important part of the industrial life of this country. In fact, one can say an important part of the world's industrial life, judging by the very large numbers of visitors from overseas. This is as it should be, because better materials handling methods are of importance to industrialized nations. The international exchange of raw materials, finished and semi-finished products imposes upon each nation the need for better materials handling methods to meet competition and also enables a higher rate of production to be obtained so avoiding unnecessary waste of human labour.

This is no time for relaxation, we must study our materials handling methods so as to improve them. It follows that in any analysis of a materials handling situation, the best approach is to study the problem as a whole and not merely one part of it, however important that part may be. The study must include an examination, not only of all the handling operations involved but also of the production processes themselves. Frequently a mode of operation that is hallowed by tradition may nevertheless be found wasteful and outdated. A critical approach may reveal many instances of processing or manufacturing operations which can be brought together and combined, or even eliminated altogether in the light of new techniques. It is worth remembering that every time a separate production process is dispensed with the handling operations to and from that process are also eliminated.

The following pages show by the written word, and pictorially, some of the highlights of mechanical handling equipment at the largest exhibition of its kind in the world.

This exhibition has been another milestone towards better handling methods. Let us carry on towards this end.



Opening Ceremony

The Seventh Mechanical Handling Exhibition, at Earls Court, was opened by The Rt. Hon. Reginald Maudling, P.C., M.P., who was introduced by Mr. Claude E. Wallis, M.B.E., Chairman and Managing Director of Associated Iliffe Press.



Claude E. Wallis, M.B.E., introducing the Rt. Hon. Reginald Maudling, P.C., M.P.



Mr. Maudling being greeted by Mr. Wallis at the entrance to Earls Court

The Rt. Hon. Reginald Maudling, P.C., M.P., making his opening speech

MR. WALLIS in introducing Mr. Maudling, said: 'On behalf of my colleagues of the Associated Iliffe Press and the Editor and Staff of our journal *Mechanical Handling*, which have organized this seventh exhibition of the series, it is my privilege to bid you all welcome here to-day.

'This is the seventh exhibition of its kind and this year it is the largest of any in the series. In fact, it is the largest exhibition in the world devoted exclusively to mechanical handling appliances.

'We are very fortunate to have the President of the Board of Trade to officially open the exhibition to-day. I am sure, Ladies and Gentlemen, that Mr. Reginald Maudling does not need any introduction from me. On your behalf I would like to take this opportunity of thanking him most sincerely for giving us the honour and pleasure of his company here to-day. I will now ask Mr. Maudling to declare the exhibition open'! (*Applause.*)

Mr. Maudling in reply said: 'I am very grateful for the invitation to declare this exhibition open and to con-



gratulate the sponsors, the Associated Iliffe Press, and *Mechanical Handling* in particular, on an exhibition which is clearly worthy of this important and growing industry. With industrialization taking place all over the world, there can be no doubt that the demand for all forms of mechanical handling equipment will be growing, and growing rapidly.

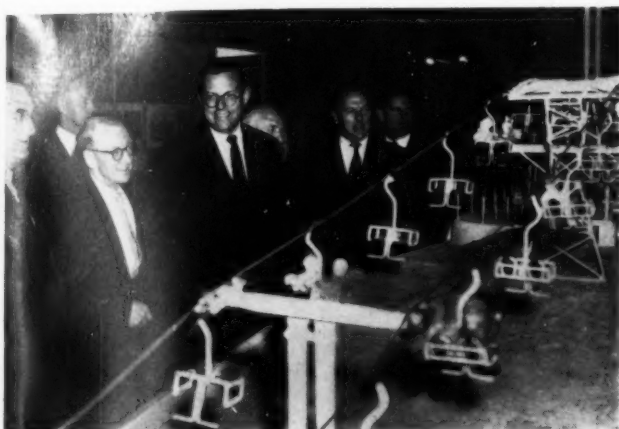
'More and more money is going to be invested in this, saving time, saving effort and cutting cost, and I am delighted to see from this exhibition such clear evidence of the very strong position that British industry has in this important sector.

'The products of the industry will be sold in growing quantity at home to meet the vigorous growth of capital investment in this country, with the steel industry and the motorcar industry at the moment in the van of progress.

'The industry already has a very substantial export achievement and I hope to see this being further increased in the future, because there is no doubt that throughout the world and the Commonwealth and other countries, there



Mr. Wallis accompanied by Mr. Maudling descending to the rostrum past the trumpeters from the Regimental Band of the Scots Guards



View of a model on the stand of British Ropeways Engineering Co., with Mr. Sharp (British Industrial Truck Association); Mr. Picton (Mechanical Handling Engineers Association); Mr. Collman, (Exhibition Manager); Mr. Maudling; Mr. Butters (Association of Crane Makers) and Mr. Tichelly (Association of Lifting Makers)

will be increasing opportunities for the sale of mechanical handling equipment.

'Already a large proportion of our overseas sales are in the Commonwealth and we want to see this expanding as more and more is done to exploit the Commonwealth, and in particular as some of the Commonwealth countries which have hitherto lagged behind in industrial development start catching up.

'There is a growing market in Europe, and we are glad to see so many visitors coming to this exhibition from the Commonwealth and neighbouring European countries. In particular I welcome visitors from our new colleagues and associates in the European Free Trade Organization. We hope that on their visit here they will find many products of interest to them.

'And so, Sir, with these words of congratulation to yourself and your colleagues and the industry generally on an excellent exhibition, and with my best wishes for the future success of the industry as a whole, I have very much pleasure in declaring this exhibition officially open'. (Applause.)



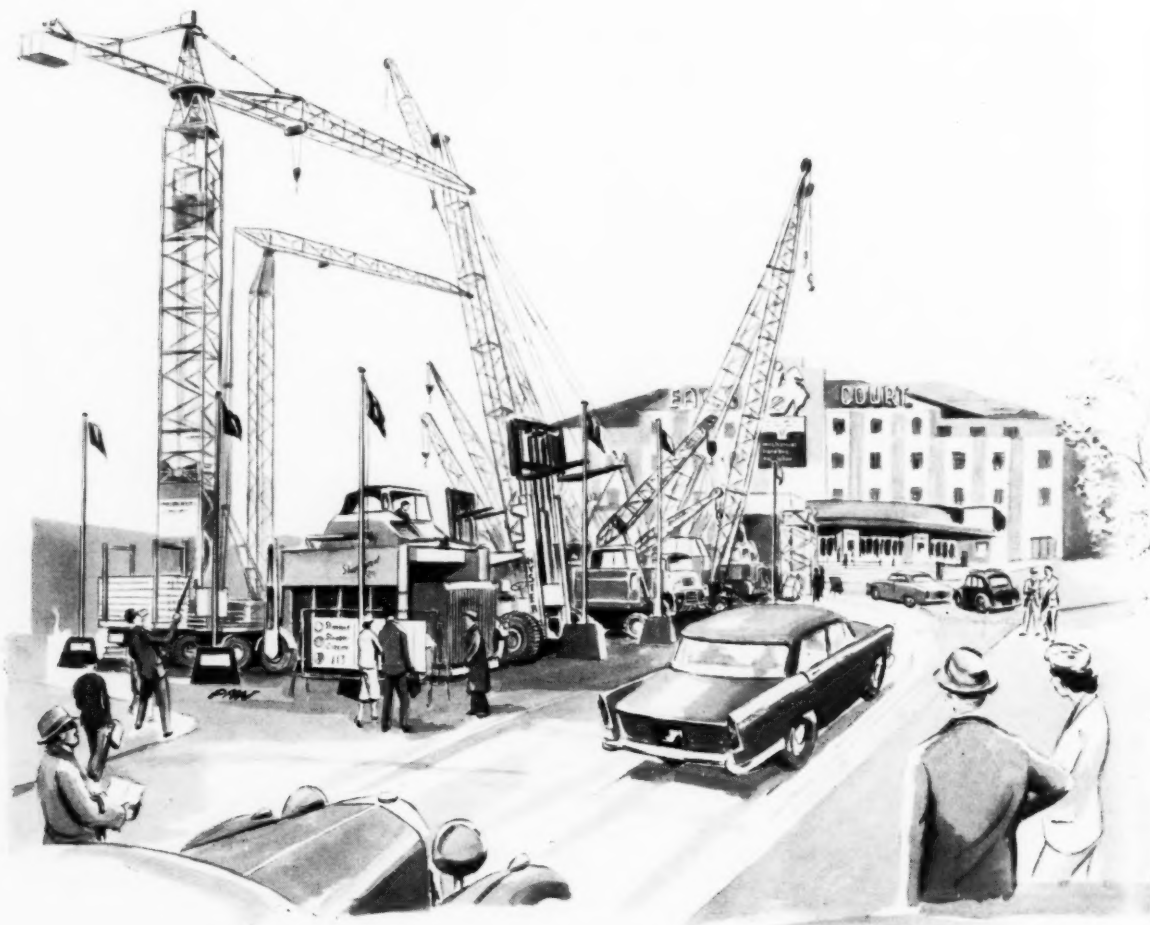
After the opening ceremony (left to right); Mr. D. Cherry Paterson, (Mechanical Handling Engineers Association); Mr. Butters, Mr. Maudling, Mr. Tichelly and Mr. J. Sharp

On the stand of Paterson Hughes Eng. Co., Ltd., Mr. Butters, Mr. Maudling and Mr. Gavin Paterson



Equipment Displayed

at the Seventh Mechanical Handling Exhibition



Our artist's impression of the equipment exhibited at the West Brompton Forecourt at the Seventh Mechanical Handling Exhibition

IN the following review of equipment displayed at this Seventh Mechanical Handling Exhibition (organized by this Journal), we have changed from our previous method of reporting the exhibits, as on this occasion they are not described stand by stand. The report is published under types of equipment, i.e. the following eleven main headings:

1. Cranes
2. Electrical and Electronic Equipment
3. Excavating and Earthmoving Equipment
4. Hoists, Lifts and Stackers
5. Bulk Handling Equipment
6. Hand Trucks and Trailers

7. Pallets, Stillages and Containers
8. Hydraulic and Pneumatic Equipment
9. Power Trucks
10. Conveyors
11. Ancillary and Other Equipment

It is not claimed that every item of equipment at the Exhibition is described but rather that the 'highlights' of the Exhibition have been taken for description.

The July issue of 'MECHANICAL HANDLING' will contain a classified guide to exhibitors' products—what they make—and should be kept as a valuable guide.



CRANES

IN RECENT years there has been a very considerable development in both mobile cranes and tower cranes, the latter being particularly suitable for building work.

A noteworthy tower crane is the Jules Weitz telescopic model Type G.60 H.V. The four lengths of jib available are 79 ft, 72 ft 2 in, 85 ft 4 in and 98 ft 6 in, for which the loads are 3 tons, 3 tons, 2 tons 17 cwt and 2 tons respectively. This crane has an unladen weight of 24.5 tons and a ballast weight of 19.5 tons; the working weight of the crane is 49.25 tons.

During the last ten years, more than 3,000 Jules Weitz tower cranes have been sold and they are now being manufactured in Great Britain under licence, by Babcock and Wilcox, Ltd. All tower cranes of this type conform to British Standard Specifications. They can be operated by remote control from the ground.

Where concreting has to be carried out on a site, there is a two-fold saving derived from the use of a tower crane; first, larger units of prefabricated formwork can be hoisted into position than could possibly be manhandled; and second, concrete can be raised directly from the mixing plant and deposited exactly where required. Similarly, large precast units can be handled with ease. Ancillary advantages include the easy vertical and horizontal movement of materials and equipment, the wider use of pallets for unloading and the storage of materials, thus keeping the site tidy and reducing waste.

Some interesting examples of the Pingon range of tower cranes were obtained from George Cohen Sons and Co., Ltd. For example, the National Coal Board Offices at Gateshead consist of a three-storey building, E-shaped in plan, with a total length of about 980 ft. A long narrow block, this clearly called for a rail-mounted crane, and a Pingon P.15 was chosen for the job. The repetitive nature of the work, combined with the facilities provided by the crane, enabled all types of formwork to be handled in large prefabricated sections. Three separate formwork gangs, each undertaking all work in its own area of the building, were served by the one Pingon crane, which also hoisted the reinforcement and concrete. The crane track was laid with a safe working distance between the inside track and the face of the external independent scaffolding. Since the building only required a jib coverage of about 30 ft, it was possible to place a full batch of concrete from an 18/12 mixer in floor and roof slabs.

All Pingon cranes are suitable not only for static work and rail mounting, but also for climbing, so that height of lift under the hook is virtually unlimited. A patented sliding head gear is incorporated in several of these tower cranes, which means that height can be varied without the need for adding mast sections, and every crane is available with remote control for all motions. The electric equipment has been designed to satisfy British requirements.

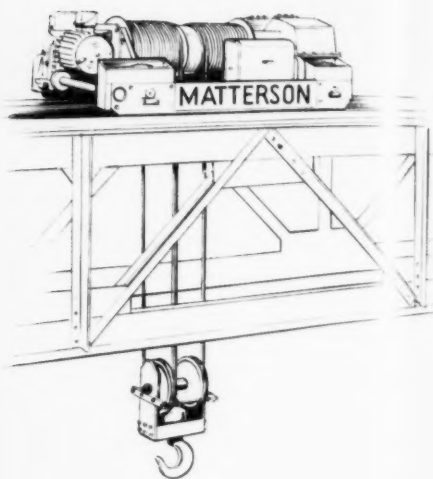


In the foreground can be seen the new Rapier 1520 mobile crane of 15 tons capacity. Ransomes & Rapier, Ltd.

The Coles mobile cranes made by Steels Engineering Products, Ltd., were much in evidence at the Exhibition, an outstanding model being the special crane designed and built for the Royal Military School of Engineering at Chatham, used with great success for bridging work. This crane with 25 men and a driver can erect a 200-ft triple-single girder bridge in about 15½ hr; this would otherwise take 100 men about three times as long.



LEFT
A view from above the display of cranes by Thomas Smith & Sons (Rodley), Ltd.



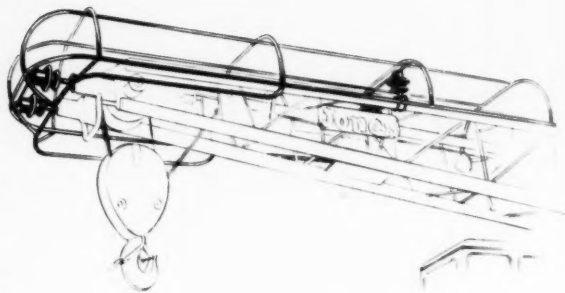
ABOVE
20-ton overhead crane winch shown by Matterson, Ltd.

All Coles cranes can be fitted with power-driven outriggers and jacks, both of these mechanisms being driven by electric motors supplied with power from the main engine; the controls are neatly arranged in the side of the chassis, and the time saved by using this equipment is quite appreciable. The jacks can be fitted with special 'elephant feet' to distribute the pressure over a wide area, saving the extra time needed to carry and locate timber beams for this purpose.

The Coles Ranger tower crane is of full-circle slew type and is mounted on four double-tyred wheels. It has a diesel-electric power unit with a Ford engine developing 61 h.p. at 2,200 r.p.m. The generator is a specially designed shunt-wound variable-voltage machine which operates over a range from zero to 400 V; the hoist motor is of 34 h.p., the derrick motor of 25 h.p. and the slew motor of 25 h.p. Electro-mechanical brakes are fitted, automatically applied to the hoist, derrick and slew motions, the shoes being spring actuated and released by a continuously rated solenoid coil. There are six lengths of jib available, from 30 ft to 80 ft, increasing in increments of 10 ft; the working radius ranges from 20 ft up to 60 ft, increasing in increments of 5 ft. When blocked, the lifting capacity varies from 5 tons at 30 ft radius with a 30-ft jib, to 1½ tons at 60 ft radius with an 80-ft jib.

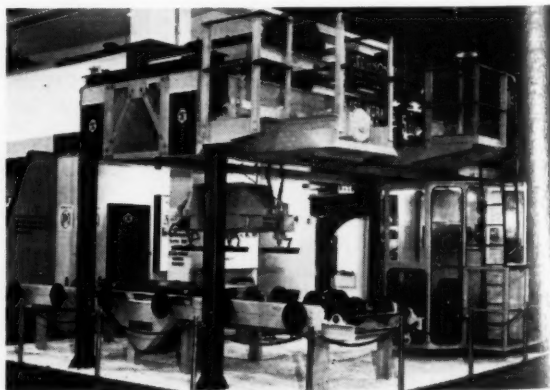
The Coles Pyrrhus mobile crane is also of diesel-electric type, powered by a Ford engine developing 52 h.p. at 1,800 r.p.m. Both the hoist and derrick motors are of 11 h.p. and the slew motor is of 2 h.p. This crane can be fitted with three alternative jibs of 20, 30 and 40 ft length; the lifting capacity is 4 tons at a radius of 8 ft with the 20-ft jib and ½ ton at a radius of 28 ft with the 40-ft jib. These capacities are in accordance with British Standard Specification No. 1757.

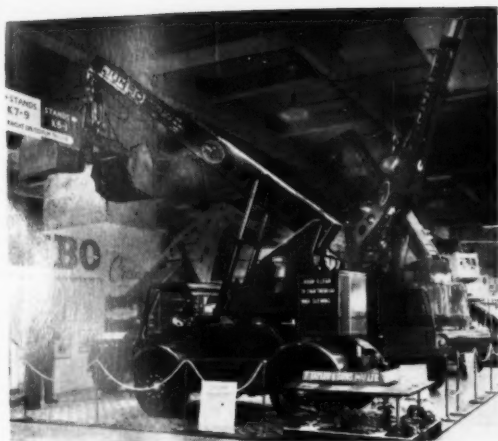
The New Rapier 1520 mobile crane has some very interesting features, the basic aims of this design being that it should have the widest possible field of application and yet be of simple and compact form. The chassis adopted for



The Jones 'Saf-T-Boom' overhead cable guard. George Cohen & Sons, Ltd.

BELOW
A 5-ton capacity overhead crane was among the exhibits on the stand of Paterson Hughes Eng. Co., Ltd.





(Top) A comprehensive display of Jumbo mobile hydraulic slewing cranes. J. Taylor & Sons (Manchester), Ltd.



The 'Iron Fairy 6' mobile crane. British Hoist and Crane Co., Ltd.



25-ton capacity mobile crane, type NL250. R. H. Neal & Co., Ltd.

this crane has two pairs of driving wheels each driven by an individual motor; these motors are electrically connected so that at all times either or both of the driving wheels is effective. This system allows the superstructure to be positioned at the most suitable point, and it contributes towards making the crane compact.

In order to give a small turning circle for the whole crane, the inner steered wheel rotates 45 deg from the dead-ahead position to the full-lock position; to achieve this large angle, the track rod is split at the centre. This provides a convenient place for the siting of the compressed-air servo cylinder. Air/hydraulic brakes are fitted to all the wheels and are operated either by the foot treadle or by the hand parking lever. A width of 9 ft was decided upon in order to give acceptable unpropped duties for the crane.

A Perkins P6 diesel engine is the standard power unit and this drives a generator through a Layrub universal coupling. Hoist, derrick and slew motors are mounted to the rear of the frame and drive forwards through Hardy-Spicer shafts to the worm reducing gears. Strut jibs are basically 30 ft long and may be lengthened in increments of 10 or 20 ft to a total of 80 ft; all lengths of this strut jib may be raised from ground level using the normal A frame. Cantilever jibs are basically either 20 or 30 ft long and may be extended by 5-ft or 10-ft extensions bolted to the ends. Cantilever jibs may be extended to 50-ft lengths by adding a guyed

30-ft extension to the basic 20-ft jib. The maximum prop load with a 10-ft propping base is 17½ tons.

The M.E.11 truck crane made by Thos. Smith and Sons, Ltd., Rodley, is a highly mobile crane with a Ford 6-cylinder diesel engine powering the chassis and a 4-cylinder engine of the same type and make powering the crane mechanism; the former has an output of 100 h.p. and the latter of 40 h.p. This crane has been designed so that it can readily be converted to work as a face shovel, as a back-acter for trench and similar work, or as a dragline excavator. With outriggers, the crane has a lifting capacity of 10 tons at a radius of 8 ft and of about one third of a ton at a radius of 55 ft, using booms with a length of 25 ft and 75 ft respectively.

The Jones mobile cranes made by K & L Steelfounders and Engineers, Ltd., are available in 53 standard designs, the smallest having a lifting capacity of ¾ ton, suitable for general building work and provided with mast equipment to give a maximum lift of 35 ft. The KL 10-10 mobile crane has a lifting capacity of 12½ tons and a cruising speed as a motor vehicle of 30 m.p.h. Strut jibs are available up to a maximum length of 75 ft, and cantilever jibs can be fitted from 30 ft to 60 ft.

The Type NL 250 mobile crane made by R. H. Neal and Co., Ltd., has a lifting capacity of 25 tons at a radius of 10 ft when jacked, or of 9½ tons at the same radius when



An extensive range of Jones cranes with a working exhibit in the foreground. George Cohen, Sons & Co., Ltd.

BELOW

The Coles Ranger 5-ton tower crane. Steels Engineering Products, Ltd.



fully mobile. It is mounted on the chassis by a large patented ball-bearing slewing ring and the whole superstructure is of all-welded construction. Power is provided by an A.E.C. 6-cylinder diesel engine developing 150 h.p. at 1,800 r.p.m. The use of a torque converter for power transmission gives extra torque for the heaviest loads and automatic increase of hoist speed for lighter loads. There is very smooth control at all loads and direct mechanical drive throughout.

The crane made by Tunny Cranes, Ltd., consists of a platform on which is mounted a slewing turntable, a derricking jib and a rope hoist. A special advantage claimed for this unit is the mobility gained by the fact that it can be mounted on practically any lorry or 4-wheel-drive vehicle. Even so, due to its light weight ratio, it can keep within the wheel loadings specified by the manufacturers. The operation of all motions is hydraulic, giving precision control. The pump is driven off the gearbox and the controls can be located in any desired position.

With a 16-ft jib, this crane lifts 2 tons at a radius of 6 ft 9 in or 12 cwt at a radius of 15 ft 6 in; corresponding figures for the 26-ft jib are 1 ton at 8 ft radius or 4 cwt at a radius of 25 ft 6 in. Hoisting is by means of an hydraulic cylinder and a six-sheave pulley system, with an automatic locking device as an integral part. In case of power failure, or if the pressure drops, the system will lock until a repair can be made, or the load can be lowered under control. Derricking is also by hydraulic cylinder and this motion has a built-in safety device should the power fail. Derricking speed is 20 sec, maximum to minimum.

The Iron Fairy, another hydraulically controlled mobile crane, is made by the British Hoist and Crane Co., Ltd. It has several interesting features. Although the crane jib can slew through 45 deg, the crane itself has the inherent stability and lightweight characteristics of a non-slewing crane. Normally, slewing cranes must either be of sufficient weight to ensure stability in all positions of slew, or they must be provided with a counterbalance weight at the back

An artist's impression of the R. H. Neal type NL 250 crane.



of the jib. This design is such that no such counterbalance is necessary.

One of the most important features of this crane is the two forward-mounted hydraulic rams, which not only provide the means of raising and lowering the jib, but also control the 45-deg slewing action. The engine is powerful enough to give the vehicle a speed on the road of about 20 m.p.h. and it is able to ascend a gradient of 1 in 5 with ease.

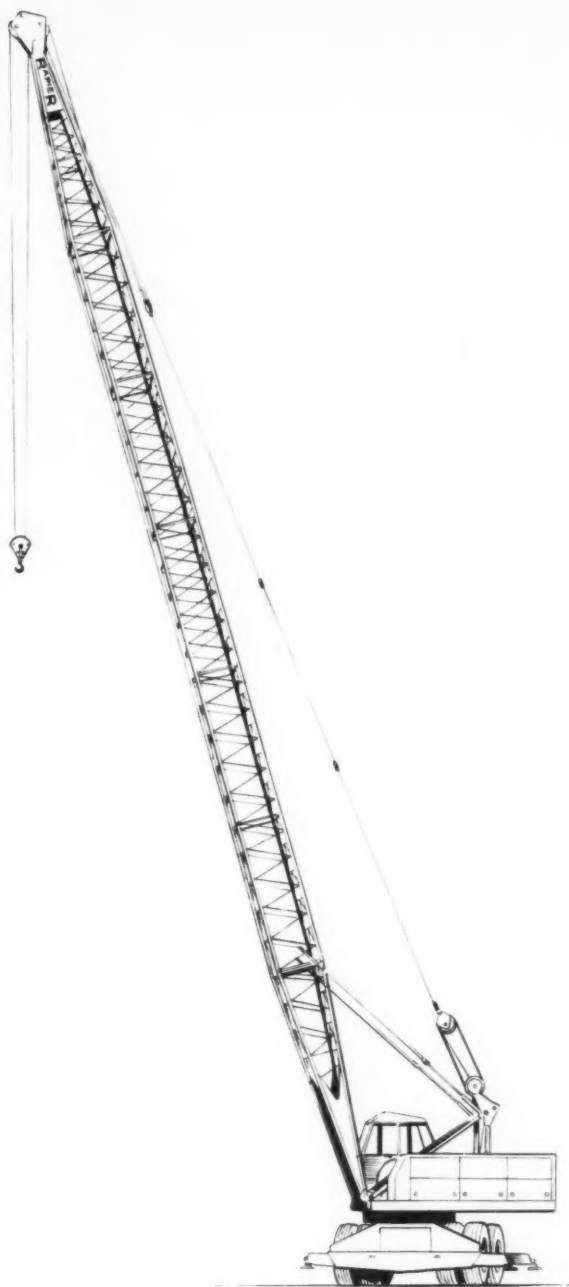
A very useful equipment for general lifting duties is the forward-mounted crane which can be fitted to any Fordson Major or Nuffield 4 tractor; made by Arley Fabrications, Ltd., it has been designed for lifting and placing loads up to a maximum of 15 cwt. The operating mechanism is an hydraulic cylinder located in the crane tower, worked through the tractor hydraulic system and controlled from the driver's seat. It can be coupled to or uncoupled from the tractor in only 15 min.

The manufacture of lifting magnets is a highly specialized and very important branch of crane manufacture, borne out by the exhibit of W. E. Burnand and Son. Their Phoenix circular magnet has been designed for lifting billets, ingots, bars and similar metal sections. For general use, however, the Phoenix circular magnet is the most useful type available; its deeply penetrating magnetic field enables it to handle all kinds of scrap and other forms of metal where careful arrangement is of minor importance.

The efficiency of Burnand magnets is largely due to the fact that special precautions are taken to remove all trace of moisture and close every crevice before sealing. The completely assembled magnet is placed in a vacuum, and impregnated under pressure, a process which takes up to four days but ensures that the magnet will be able to withstand every kind of climatic condition. These magnets are made in a range of sizes from 2 ft up to 6 ft 5 in dia, the lifting capacities for solid steel ingots or heavy armour plate being 11,200 and 67,200 lb respectively.

This firm also makes a cable-coiling drum which will be of

Artist's drawing of the Arley forward-mounted tractor crane. Witlor, Ltd.



Artist's impression of the new Rapier 1520. Ransomes & Rapier, Ltd.

considerable interest to crane makers and users. This has an aluminium alloy drum and runs on ball-bearings fixed in the boss by circlips; the ball-bearings are mounted on a steel shaft securely fixed to the mild-steel drum supporting bracket. The interior of the drum is divided into two compartments by s-centre web, one side containing the actuating mechanism, the other side the electrical collector gear. The drum is operated by a clock-type spring secured to the periphery by a countersunk screw and nut, the centre of the spring being secured in a similar manner to the spring

General view of exhibits assembled in the West Brompton Forecourt. The Babcock-Weitz tower crane is in the centre



hub. A ratchet spring is mounted in the latter which operates on to the ratchet keyed on to the shaft. The other compartment of the drum contains the collector gear, and consists of three double-brush holders mounted on an insulated spindle fastened to the web of the drum. The brush gear is connected directly to the feeding cable which is secured to the drum by two clamping saddles. Drums are made in three sizes, for heights of lift up to 30, 50 and 80 ft respectively.

The overhead electric travelling cranes made by Matterson, Ltd., are designed, manufactured and tested in accordance with B.S.S.466, and the relevant Standards covering motors and control gear. The main load-carrying frame and gearing are of alloy

Looking down on the stand of Steels Engineering Products, Ltd., with the Coles Ranger, centre.



or carbon steel, proportioned in accordance with the relevant British Standard with an overall factor of safety of 5. Ball or roller bearings are used for all journals revolving under load including the rope barrel, gearbox, sleeves and runners. The wire rope used is of best plough steel with a breaking strength of from 100 to 110 tons/sq. in., of 6/24 construction, with a factor of safety of not less than 6 to 1. Galvanized and stainless-steel ropes are available for corrosive atmospheres.

On floor-controlled cranes the push-buttons are suspended from the crab, or they can be suspended from a fixed point on the crane structure; an alternative arrangement can be a combination of both, such as lift and traverse controls from the crab and travelling controls from the crane. All motors are of reversing type, totally enclosed, and generally on cranes up to a lifting capacity of 10 tons it is standard practice to fit squirrel-cage high-torque motors on all motions, although wound rotor motors are occasionally fitted to the long-travel drive where intermediate speeds are required.

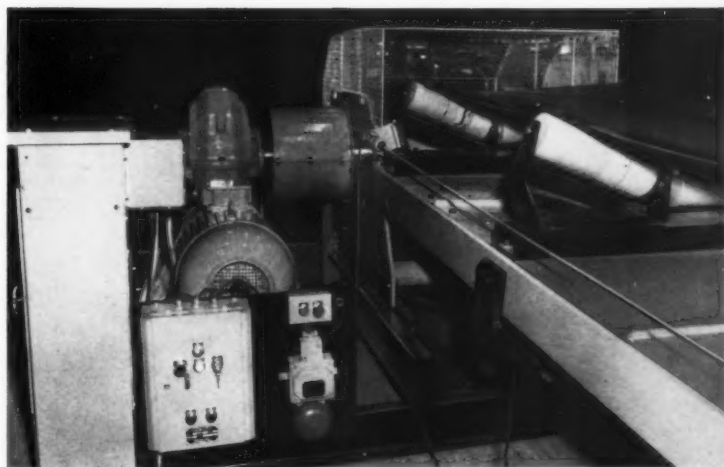
The Duo-speed motor unit made by Herbert Morris, Ltd., Loughborough, has been designed to lift or lower loads slowly and with precision, requirements which occur in industry far more often than is generally imagined. This unit consists of a main motor, an auxiliary motor, a gear reduction and a clutch which either transmits the effort of the auxiliary motor, or allows the latter to remain inactive while the main motor is working. For a hoisting or lowering speed of one-tenth of normal fast speed, the auxiliary motor is engaged and drives the rotor of the main motor at one-tenth of its normal speed.



ELECTRICAL AND ELECTRONIC EQUIPMENT

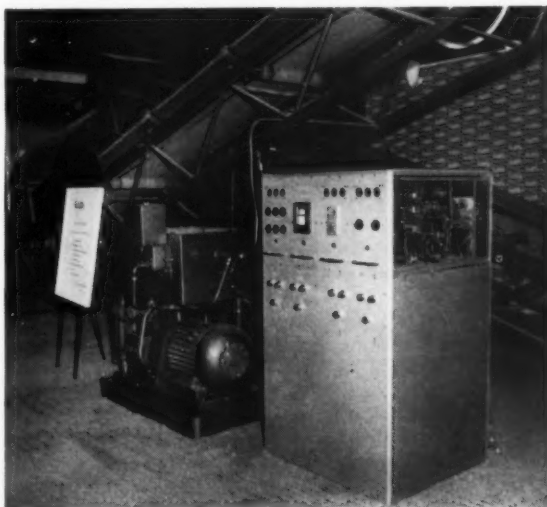
A LARGE proportion of the equipment displayed incorporated electric drives, operating from both mains and self-contained battery supplies, and there were many examples of electrical and electronic-control schemes. A number of manufacturers were showing specialized equipment, including a vibrating motor exhibited by the Anglo Electric Co., Ltd. Motors of this type are available from $\frac{1}{4}$ to 1½ h.p. and can be used whenever a vibrating motion is required, in the drives for conveyor, screening, hopper and continuous-drying systems, especially those handling loose material in bulk quantities, and in tamping equipment and machines for breaking or grinding material. Two of these motors were shown operating a screen. Other exhibits included a new range of totally-enclosed fan-cooled motors with outputs ranging from $\frac{1}{4}$ to 50 h.p. and using Class 'E' insulation, examples from the $\frac{1}{4}$ -to 50-h.p. range of 'C'-type ventilated motors and geared units and a number of A.C. and D.C. crane motors, which are specially designed for frequent reversing and variable-speed control. Several fractional h.p. motors ranging from $\frac{1}{4}$ to 1 h.p., including two of the capacitor type and six geared units for use on conveyor drives, were shown, while the company's Aircraft Equipment Division displayed both linear and rotary actuators. One of the linear types was capable of giving a 3,000-lb thrust over an 8.5-in stroke in 35 sec, suitable for controlling dampers, butterfly valves, furnace doors and gates on conveyor belts, while the largest rotary actuator shown could deliver a maximum torque of 150 lb/in through an angle of 180 deg in 16 sec and was designed for use in the nuclear-energy field for the remote handling of radioactive materials.

Examples of motors and control gear shown by A.E.I., Ltd., included new ranges of squirrel-cage and slip-ring induction motors rated from 80 to 285 h.p. and having Class 'E' insulation with a 65-deg C temperature rise, and a $\frac{1}{4}$ -h.p. 1,425 r.p.m. D.C. motor with a solid iron core and poles and redesigned end shields and brush gear. Geared motor units shown included types with oil-immersed double-reduction straight spur gears in three sizes, covering outputs of 1 to 7½ h.p. at speeds of 92 to 290 r.p.m., and with helical gears for outputs of 1 to 40 h.p. Among the range of motor-control equipment, for single- or multi-motor drives, were the type M.M.C. and C.C.W. multi-motor control centres. The type C.C.W. unit embodies individually-isolated compartments, drawout feature, and optional back-to-back arrangement of starter panels. The M.M.C. series 1,000 also has withdrawable trays and is for starting motors up to 250 h.p. Both centres can also be used for distribution circuit control. The crane protective panel exhibited is suitable for duties where the total full-load current does not exceed 100 A. Within the enclosure is an isolator, transformer, contactor, overload relays and pilot relays. The panel is equipped with stop button, indicating lamp and reset button and an inspection lamp with 30 ft of



Showing the application of an emergency trip wire to a conveyor. *Hugh Wood & Co., Ltd.*

A photo-electric weighing control cabinet with conveyors. *Richard Sutcliffe, Ltd.*





Blencut-Scee counting and batching demonstration unit. Electromagnets, Ltd.



Seen on the stand of Oldham & Son, Ltd., four Directors of the company discuss the latest 'Pg' traction battery on view at the exhibition. (Left to right): Dr. C. D. J. Statham (Sales Director); Mr. John Oldham, O.B.E. (Chairman); Mr. Edward Oldham (Managing Director); Mr. Orlando Oldham (Assistant Managing Director)

Auto/Manual and sequence control panel for Tulley Engineering Co., actuators. West's Group of Industries

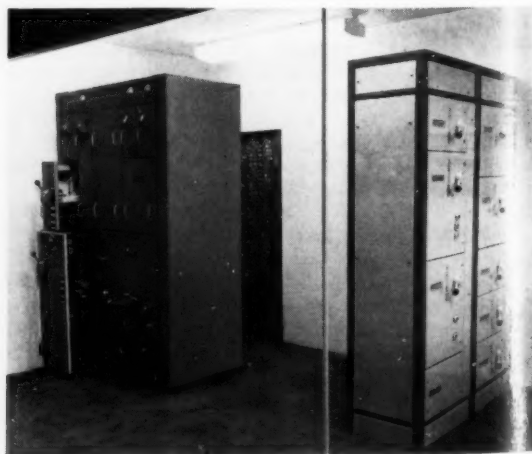


rubber-insulated cable. A working display illustrated the application of a static switching-control system, employing contactless devices in place of conventional relays.

Included in the exhibits on the C.A.V., Ltd., stand were typical 4½ and 5 in dia D.C. generators, for use in 12 and 24 V battery-charging systems. Also shown was a 7 in dia 3-phase alternator for 24 V systems, together with a control board and rectifier. The A.C. machine has certain advantages in applications where the prime mover operates at low speeds for long periods, since it is capable of generating the whole, or a substantial part, of its output over a wide speed range and it can therefore maintain the battery in a satisfactory state of charge even when the engine is idling. It is lighter and simpler in construction than a D.C. machine of comparable output, and has no commutation problems. The alternator is used in conjunction with a rectifier and a current-voltage regulator of conventional design. A battery cut-out is not, however, required since the rectifier itself prevents the battery from discharging through the alternator when the machine is stationary. Two starters, a 4.5 in dia co-axial type and a 5.0 in dia axial type, for cranking diesel engines were shown. In the axial starter, engagement with the engine flywheel is effected by a movement of the complete armature, whereas in the co-axial type the pinion alone moves forward to engage with the engine. In both types of starter, engagement occurs under reduced power and full power is only applied after a trip switch is operated by completion of the axial movement. Typical lead-acid and alkaline batteries for starting and other purposes, relays and switches for general duties and the 'Thermostart' starting aid for diesel engines were also exhibited.

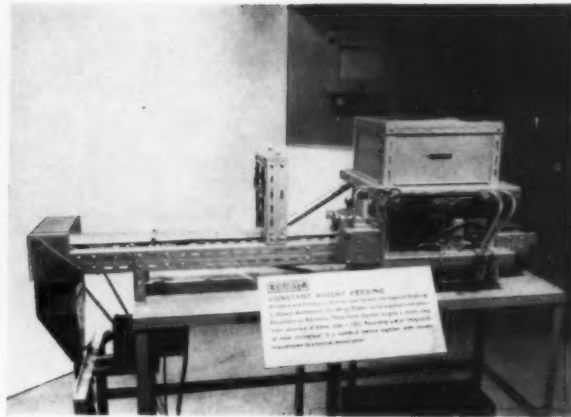
A range of geared motors with outputs through straight-line and right-angle drives of up to 2 h.p. and from 25 to 1,500 lb/ft torque were shown by the Normand Electrical Co., Ltd. A new auxiliary flange-mounted gearbox for use with the type D.S. geared motor which gives between two and four extra stages of spur reduction and overall ratios up to 7,000:1 was also exhibited. For even lower speeds, two of the auxiliary boxes could be fitted. Some of the motors were shown in conjunction with 4 or 6-in dia magnetic brakes, the continuous retarding torque of the 4 in size being 6 or 3 lb/ft, and that of the 6 in size 12 lb/ft. In these brakes the two shoes are held down on the drum by coil springs when the motor is stationary. The laminated brake magnet is energized when the motor is switched on and

Multi-motor control panels shown by A.E.I., Ltd.





5 h.p. 'packaged unit' controlling motors on a lead-foil coiler. Albert Mann Eng. Co. Ltd.



Model of constant-weight feeder with Elliot Bros. recording panel. Webb Conveyors and Automation, Ltd.

...a hardened-steel conical plunger between the shoes, lifting them off the drum. When the motor is again switched on, a spring lifts the steel plunger and the coil springs force the shoes down on to the drum, stopping the motor. Shading rings on the magnet poles reduce magnetic hum to a minimum. Other items exhibited included flameproof and battery vehicle motors and there was a Ward Leonard speed-control set used in conjunction with a geared motor.

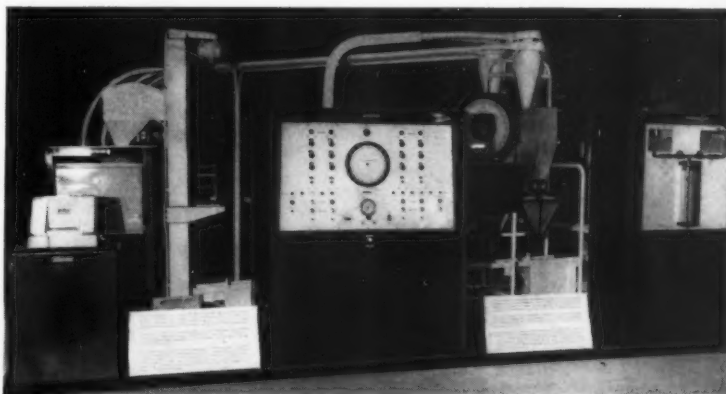
Shown on the Brookhirst Igranic, Ltd., stand was one of a new range of disc brakes, produced for A.C. supplies, and designed primarily for machine-tool and small-crane motors. The brake, which is arranged for flange mounting and can be provided with a hand-release feature if required, can be incorporated in or immediately adjacent to the actual motor. Also shown on this stand was a crane-control panel using A.C. block contactors. The speed control provided gives rotor-resistance acceleration in the hoisting direction, with the contactors closing in timed sequence and as determined by the position of the master controller handle. For lowering, two windings are connected in parallel on notch one and exert a retarding torque on the descending load, the speed being proportional to the load, and on the second notch the motor drives down at full speed. The contactors used are fitted with totally-enclosed heavy twin-brake contacts of sintered silver. Ample arc-rupturing capacity is provided by induced pressure in the arc chambers. A.C.- or D.C.-operated magnets can be fitted and when the latter are used the transformer and rectifier, which are amply rated to feed the control circuits of all panels on the crane, are mounted on the crane protective panel. Examples from a range of lifting magnets, the largest of which will raise nearly 50 tons, a grouped starter switchboard, multi-disc electromagnetic clutches, and a working model demonstrating the use of 'Bi-stat' contactless switching units were also on view. These units are in the form of encapsulated circuits based on magnetic amplifiers operating at intrinsically safe low voltages and power levels.

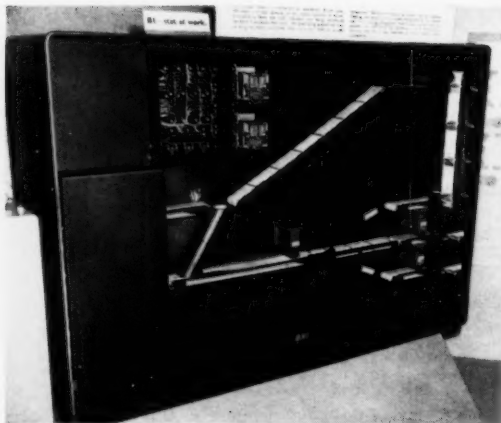
An interesting range of both squirrel-cage and slip-ring induction motors with integral sliding rotor brakes was among the exhibits on the stand of Acrow (Engineers), Ltd. These 'Demag' motors, of German manufacture, incorporate a conical rotor and stator. With the current switched off, the conical rotor is pushed out of the stator by a brake spring. The displacement of the rotor, which amounts to about $\frac{3}{8}$ in. to a maximum of $\frac{9}{8}$ in., ensures that a brake disc fitted to the rotor shaft is pressed against a braking surface. Consequently, at standstill the motor is

always braked. When the current is switched on, the magnetic force of the stator field is sufficiently strong to overcome the resistance of the brake spring, and pulls the rotor into the stator against a stop which ensures a normal air gap. At the same time, the brake disc is withdrawn from the braking surface, allowing the motor to speed up in the normal way. A sectioned motor on the stand clearly illustrated the constructional details of the machine and there were complete motors representative of the range which is available. Squirrel-cage motors are available with two, four, six or eight poles and corresponding speeds of 3,000, 1,500, 1,000 and 750 r.p.m. with power ratings between 0.1 and 46 h.p., and 4- and 6-pole slip-ring motors up to 36.5 h.p. are available. Also shown were examples of the company's 'Micro Speed Unit' which is a combination of two motors with sliding rotor brakes connected by a reduction gear. The output shaft runs either at main motor revolutions or at a speed the ratio of which is determined by the use of intermediate gears fitted to the Micro Speed motor. An attachment is available for all models enabling the brake to be released at motor standstill if required, and a flat brake disc can be fitted to all types instead of the tapered disc where steady and progressive braking is needed.

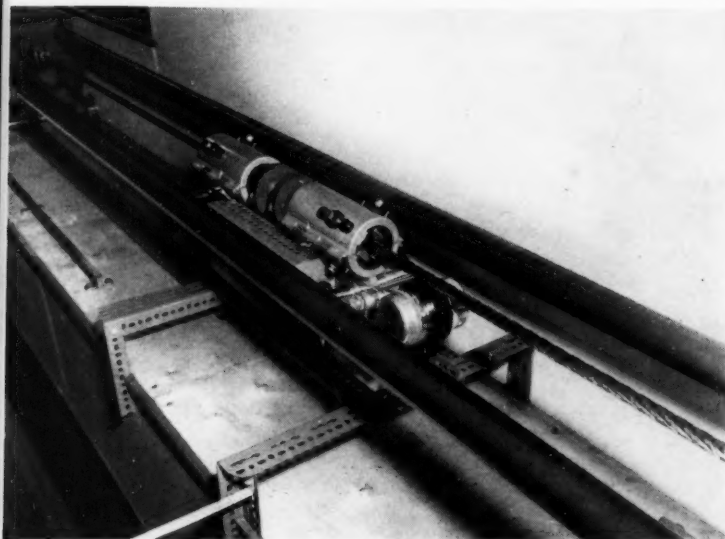
A range of geared motors and speed reducing and increasing units was shown by Electropower Gears, Ltd.,

Control panels of proportioning equipment shown by Simon Handling Engineers, Ltd.





A model demonstrating the use of 'Bi-Star' units. Brookhirst Igranix, Ltd.



The Electro-magnetic 'Defectograph' unit for internal inspection of ropes. British Ropeway Engineering Co., Ltd.

A sectional drawing and three specimens of magnetic particle couplings. S. Smith & Sons (England), Ltd.

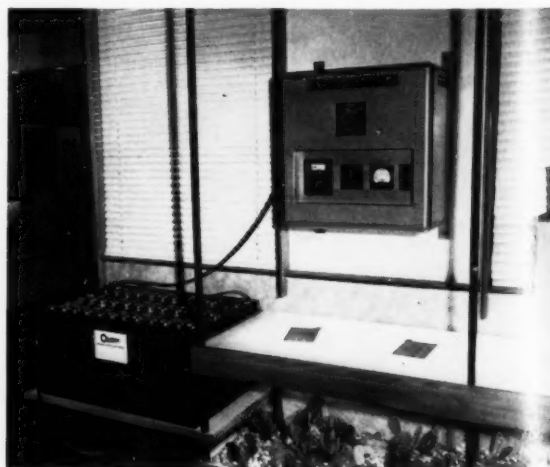


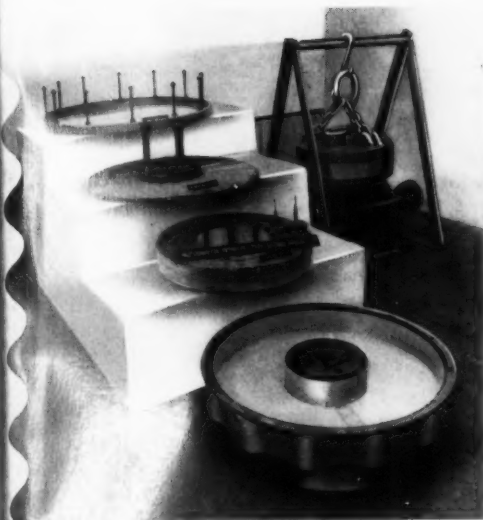
representative of the production series available. Types are available rated from $\frac{1}{16}$ to 300 h.p., with standard ratios from 1.5:1 to 2 million:1 for reduction, or fitted with speed-increase gears up to 35,000 r.p.m. Other products, of which samples were exhibited, included contra-rotating co-axial shaft speed reducers and geared motors from $\frac{1}{4}$ to 25 h.p., totally-enclosed electro-magnetic disc-type brakes, and variable-speed geared motors with mechanical and electronic control.

The industrial actuator which was exhibited by Telflex Products, Ltd., consists of a totally-enclosed electrically-powered screw jack which is substantially weather- and corrosion-proof. The power output can be set to a pre-determined value between 40 and 4,000 lb, according to requirements. The normal stroke is 12 in, although other lengths can be supplied to suit the application, and the ram speed is 32 in/min with a standard 2-pole motor or 16 in/min with a 4-pole motor. With the standard motor at 12-in stroke, the stroke time is 22 sec. The standard motor consists of a totally-enclosed stator-rotor unit built into the body of the actuator. In the '3,000' series the motor is a 3-phase machine operating at 400 V, 50 c/s, while the motor in the '1,500' series is a single-phase capacitor-run type operating at 200 V, 50 c/s. In either machine, the full load current is less than 1 A. An electrically released twin disc brake checks over-run and provides instant positive locking in any stroke position. A control position indicator is available which consists of a variable reactance transmitter in the unit with the actuator coupled to a moving coil receiver in the control panel. These components are supplied complete with a step-down transformer. The normal operating voltage of this circuit is 12 V A.C.

Electro-mechanical actuators and control equipment were also shown by the Tully Engineering Co., Ltd., a member of the West's Group of Companies. One of the main features was a demonstration of the twin Mark V actuator, shown operating a 'Lopulco' hull-feeder slide valve loaned by International Combustion Products, Ltd. This actuator, which is ideally suited for applications where positive, non-twist movement of a slide plate is required, consists basically of a hollow ram operated by an internal screw thread electrically-driven through a chain or spur gears. Limit switches are provided to control the amount of ram travel. A feature of the unit is the provision of adjustable backlash on the ram to impart a hammer-blow

A traction battery and charger shown by Oldham & Son, Ltd.





Large magnet taken apart to show component parts. W. E. Burnand & Son, Ltd.



E.M.I. 'Robotug' driverless truck. Conveyancer Fork Trucks, Ltd.

effect to the actuated mechanisms, overcoming a tendency to stick where high temperatures or materials of an adhesive nature are prevalent. A wide range of output speeds, thrusts and strokes are available. The maximum static load on the ram is 4,000 lb in either direction, the casing being designed to withstand a static load of 8,000 lb. The maximum stroke available in standard units is 25 in, but this can be exceeded for special requirements. Also exhibited was a Mark II actuator shown operating a 15-in dia butterfly valve, and a Mark II actuator operating a 4-in dia high-pressure steam valve. Equipment in the control panel on the stand operated these exhibits either automatically by a drum controller or manually by push buttons.

Among the vibrators to be seen at the Exhibition were the 'Syntron' models shown by Riley (I.C. Products), Ltd., a member of the International Combustion Organisation. In the type V.55 units vibration is effected by an electro-magnet with a variable-amplitude control which enables the intensity of the stroke to be varied to suit the product. In all cases, the units are supplied complete with controllers for connecting direct to a single-phase 50-c/s supply, a rheostat being incorporated which gives smooth control up to the maximum capacity of the machine. The controllers are arranged for separate wall mounting. These vibrators have an input of 300 W. The high-speed V.4 model is a rotary-type machine and is the smallest in the 'Syntron' range, being suitable for use on small chutes and hoppers of not more than 1½ cu. ft. capacity. The vibrator has a net weight of 5 lb and operates at 6,000 vibrations/min on a 230/250-V single-phase 50-c/s supply. Adjustment of the amplitude or power can be made by turning a screw.

Another stand on which vibrating equipment was shown was that of E. P. Allam & Co., Ltd., where both electromagnetic and rotary types were to be seen. The rotary types incorporate squirrel-cage motors wound for standard voltage 50- or 60-c/s supplies. They are totally enclosed and impervious to damp, and comply with the regulations for use in dusty atmospheres. The normal vibration frequency is 3,000/min, but special models for other frequencies can be supplied if required. The models shown have vibrating

forces, varying from 75 to 1,200 lb, with corresponding power consumptions of 150 to 500 W.

Both A.C. and D.C. industrial solenoids which have built-in shock mounting on both the energizing and de-energizing strokes were shown by Sharp Control Gear, Ltd. The A.C. series of vertically- or horizontally-mounted push or pull solenoids covers strokes from ½ to ¾ in and forces from 2 to 50 lb, while the D.C. series of vertical-mounting push-type solenoids covers strokes up to ½ in and forces up to 45 lb. Both types are for 100-V operation. Cam-operated contactor controllers for the operation of cranes, winches, machine tools and battery-electric vehicles and a range of limit and foot switches were also shown by this company. A major feature on their stand were switch- and control-gear units and ancillary equipment for the 'Zidpark' automatic car park being built in London by Myton, Ltd., a member of the Taylor-Woodrow Group. The car park when completed will include 16 vehicle lifts, and the equipment displayed included a console panel, relay panel and main contactor panel for each lift, a centralizing unit for positioning the cars accurately on each lift, and a mimic diagram used for demonstration purposes to illustrate the operating sequence and to assist testing during manufacture. Each of the lifts will serve six floors and a basement, delivering two vehicles to each floor on either side of the lift well. The sequence of operations for entering or withdrawing a car from the park, or transferring a vehicle from one position to another within the building, is automatically controlled by this equipment.

Featured on the stand of the Albert Mann Engineering Co., Ltd., was a lead foil coiler, the motor of which was controlled by one of the company's 5-h.p. packaged motor-control units. A second packaged unit was used in conjunction with a 1½-h.p. motor driving a function generator which supplied signals to the 5-h.p. unit. These units are available for controlling motors of any size from 3 to 75 h.p., with or without a constant h.p. range. They provide a continuously variable-speed control over the whole range of the motor or alternatively may be used as a continuously variable-D.C. source. Either static control or Ward Leonard

control may be used. The static-control system is suitable for smaller motors operating a constant-torque range and provides a fixed motor field and a variable armature current to control the speed. The field current is automatically reduced when the motor is stationary. The Ward Leonard control provides armature and field regulation. With full field, the armature current controls the speed over the constant-torque range up to the normal speed, after which the field current is reduced as the speed is increased over the constant-power range. Tacho-generator and/or armature current feedback is applied according to the stability and accuracy requirements and automatically controlled acceleration and 'emergency stop' dynamic braking can be provided as required. Both systems employ thyatron rectification, controlled by the *Ameco* pulse-control method, in which a series of sharp pulses are used to intercept the grid-control characteristic. This system ensures that, should the initial firing point be advanced beyond the zero degree, the valve will still conduct as soon as the anode voltage becomes positive. In addition, the grid is maintained at a slight positive potential during the whole of the conduction period and the firing angle has a direct linear relationship to the controlling voltage.

Although most of the conveyors using electric drives on show incorporated separate electric motors, a number of compact units specially developed for this application were to be seen. One of these was the 'Theorite' motorized drum shown by the Richards Structural Steel Co., Ltd. The drum, the construction of which was well shown by a sectioned model, consists essentially of a 3-phase stator-rotor unit built within a conveyor head drum to which it is geared internally by an epicyclic train. The end housings form the drum into an oil-tight chamber which contains a quantity of oil, free to circulate through both the motor and the gears, acting as a lubricant for the working mechanical parts and bearings and as a coolant for the motor, the windings of which are dipped in epoxide resin. The standard motor units are wound with Class 'E' insulation having a maximum temperature rise of 65 deg C. The motor leads are taken out through a specially sealed opening in the fixed shaft to a standard terminal box. The motors used in these units have power ratings from fractional up to 20 h.p. Electromagnetic brakes or back-stop devices can be fitted and flameproof models are available.

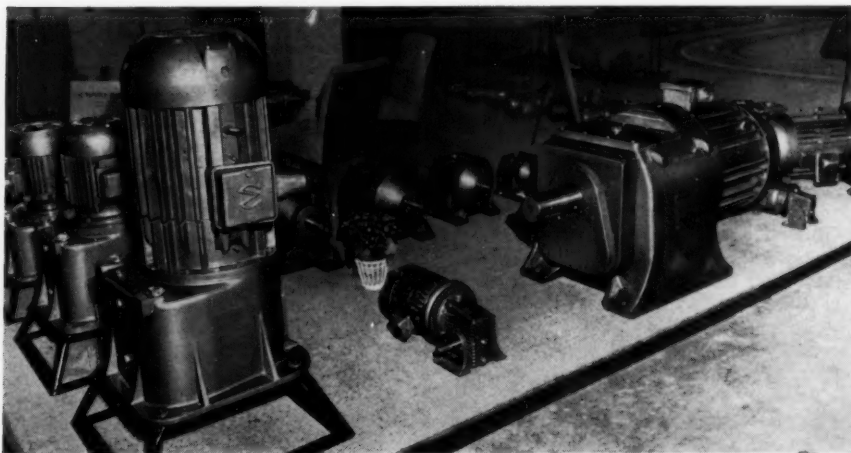
In addition to a conveyor-belt protection and sequence-control switch, used in a working exhibit to illustrate belt protection, Hugh Wood & Co., Ltd., featured an improved-

pattern emergency trip-wire system. A single concentric-pull wire runs the length of the conveyor, containing a conductor carrying a current at 15 V. A pull on the wire, giving a deflection of less than 6 in, is sufficient to break switches connecting adjacent lengths of wire. When the trip-wire circuit is broken, a relay is de-energized which opens the associated-control circuit contacts and automatically stops the conveyor or machinery motor. At the same time auxiliary contacts open, keeping the circuit 'locked out' when the trip wire is released. Additional contacts are provided for operating an alarm bell and an indicator light when the system is tripped. Re-starting can only be achieved by a key-operated reset switch in the control panel. If the trip wire should be accidentally short circuited or connected to earth, a rectifier incorporated at the most remote point of the trip-wire circuit is shorted out and the resulting full-wave alternating current flowing in the circuit, de-energizes the relay and automatically stops the motor.

A unit that will give complete protection against mechanical failures for all types of machinery, which are power driven, was shown on the Redler Conveyors, Ltd., stand. This unit, the 'RoCon', will shut down the motor of any machine in the event of mechanical failure, such as the breaking of a driving chain or belt. When used in conjunction with a single machine, the 'RoCon' unit, contains a mercury switch which is open when the 'RoCon' shaft is stationary. This switch is tripped to the closed position by an operating arm as long as rotation continues. When rotation ceases, the arm falls and permits the mercury switch to return to the open position, thus breaking the electrical circuit. In cases where a number of process machines operate in series, it is advantageous to have immediate general warning of a breakdown, together with an indication of the particular machine at fault. These additional safeguards are readily available by using relays in conjunction with the 'RoCon' unit.

A system for electrically weighing and controlling belt-conveyed solids was demonstrated by Murphy Radio, Ltd. The 'Transweigh' system utilizes a weighing carriage incorporating a resistance-type load cell which senses the weight of the material on the belt. The belt speed is measured by either a selsyn system or a tacho-generator driven by the belt. Where the selsyn system is used, separate variable signals from the load cell and selsyn drive are fed to an integrator incorporating a fan-type meter, showing the flow rate of the conveyed material and a seven-digit counter

Two large gear units on the stand of Electropower Gears, Ltd.



A sectioned 4-h.p. squirrel-cage taper rotor motor with other motors of the same range shown by Acrow (Engineers), Ltd.





A motorized 'Thorite' motorized drum demonstrator. Richards Structural Steel Co., Ltd.



Part section showing internal construction of the 'Ironclad' gauntlet battery. Chloride Batteries, Ltd.



Two-rate charger for 18-cell batteries at up to 120 A with covers removed. Legg (Industries), Ltd.

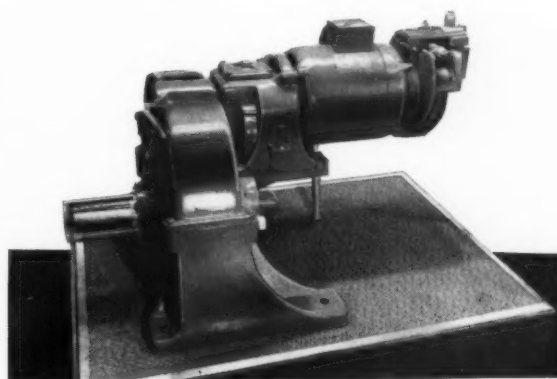
displaying the total weight. In the system employing a tacho-generator, the output voltage from the generator is proportional to the belt speed, and is fed to the load cell which contains a set of strain gauges. As the cell is stressed by the load on the belt, the strain-gauge wires vary proportionately in electrical resistance. The load cell output voltage is thus the product of belt speed and material load. This voltage is measured by an electronic potentiometer which indicates and records the instantaneous flow-rate while a digital counter built in the recorder registers the total weight.

A model of a constant-weight feeder was featured on the stand of Webb Conveyors & Automation, Ltd., and details were available on this stand of the electrical-weighing system manufactured by the Industrial Weighing Division of Elliott Bros. (London), Ltd. The basic measuring element of this system is a load cell which, when subjected to compression loading, undergoes deformation. The strains set up are measured by two pairs of strain gauges, an 'active pair' at the point of maximum stress and a 'passive pair' which take either no stress or a stress of opposite sign to that measured by the active gauges. The four gauges have matched characteristics and are connected in a Wheatstone Bridge circuit. When the circuit is energized the bridge is balanced and has no output when there is no load on the cell. When a load is applied to the cell the bridge is unbalanced and an electrical-output signal proportional to the load results. Indicator heads, with scale lengths of 25 or 50 in, are connected to the load cell by four-core cable. Full-scale travel of the indicator pointer from zero to capacity load takes eight sec. Up to five independently adjustable set-point contacts can be fitted to the larger indicator to provide control facilities and a slave slide wire can be incorporated to operate a remote indicator or recorder. A control unit can be used in applications where regulation by weight is necessary, for example maintaining hopper- or bin-contents level. The unit operates a set of heavy-duty changeover contacts when the load on the cell reaches a point predetermined by setting a dial. This dial controls the amplitude of the out-of-balance voltage of a reference bridge incorporated in the unit, and the circuit

is so arranged that the changeover relay operates when the reference bridge out-of-balance voltage is exceeded by that of the load-cell bridge.

An exhibition unit handling 3-granular solid materials and one liquid, demonstrated the Simon Handling Engineers, Ltd., automatic proportioning system. The formula for a batch, which could consist of all four materials, or of any permutation of the four, or that for a series of batches, was set out on a control panel either by feeding a punched card containing the necessary information into a card reader, or by manipulating decade dial switches. Batching then proceeded automatically, lamps on a panel indicating each stage of the proportioning cycle. Weight control is achieved by fitting a variable-electric resistance to the back of the dial-head, with the slider coupled to the pointer spindle and the resistance track fixed. When the pointer rotates, the resistance is increased in proportion to the weight in the weigh hopper. In practice, a linearity of one part in a thousand can be achieved. The resistance forms one arm of a bridge network, two of the remaining arms being fixed

Type 1500 'Telemotor' and 6-in dia brake. Norman Electric Co., Ltd.





The A.L.F. driverless truck. Conveyancer Fork Trucks, Ltd.

and the fourth being set, by the punched card or decade switches, according to the quantity of material which is to be fed into the hopper. When a batch containing a number of different materials is to be made up, the formula is set by the punched card or dials and the bridge circuit used to check that the dial pointer has returned to the zero position. When the start signal is received, a stepping switch introduces into the bridge a resistance corresponding to the weight of the first material to be fed, and the material then enters the hopper. As the hopper weight increases the pointer revolves, increasing the resistance coupled to it, until the bridge is balanced when the desired weight has been reached. The first machine now stops feeding and the stepping switch introduces an additional resistance equivalent to the weight of the second material to be fed, which enters the hopper until the bridge is again balanced.

A conveyor circuit consisting of two main conveyors, one electrically and one hydraulically driven, a short cross conveyor, a chute, belt weighers and a batch-weigh hopper was operating on the Richard Sutcliffe, Ltd., stand. Part of this circuit was controlled by electronic equipment. Material travelling up a fixed-speed belt operated a continuous weigher, which converted the weight of material on the belt to an equivalent electrical signal, which was passed to the main-control console. Adjacent to the weigh- idler section was a small generator driven from the belt, which produced a voltage proportional to belt speed. This voltage was also passed to the main console where the two signals were multiplied to give an output directly proportional to the rate of flow. A chart recorder provided a continuous record of the flow rate. The signal was further amplified and passed to an integrator which recorded the total quantity of material passing, giving a direct visual indication and a printed record on paper ribbon. Belt speed was measured by a device which generated a number of pulses for every foot of belt travelling past and added the pulses over a period of 15 sec to give a reading directly in ft/min stroke. The electronic equipment on this stand was supplied by Craven Electronics, Ltd., a member of the Sutcliffe Engineering Industries Group.

A number of lifting magnets for use with cranes and fork lift trucks were to be seen. W. E. Burnand & Son, Ltd., were showing a 40-in dia 'Phoenix' magnet designed for use with mobile cranes. This magnet, which with its control

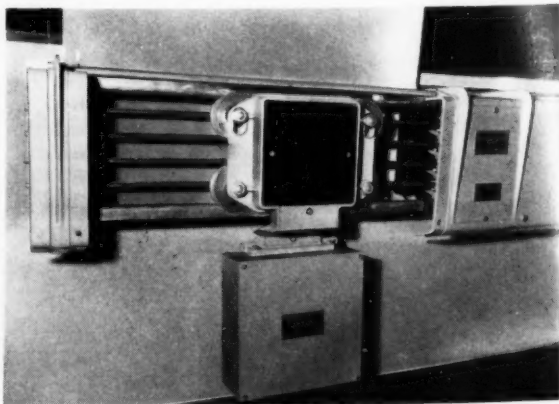
gear has a power consumption of 4.92 kW, weighs approximately 1,762 lb and is capable of lifting solid-steel ingots or heavy armour plate weighing up to 24,640 lb. Also shown on this stand was one of a range of magnets developed for use with standard fork lift trucks. This 18-in dia unit weighed 204 lb and could lift billets or slabs up to 5,600 lb. The range covered magnets from 12 to 20 in dia weighing from 1 to 2 cwt and capable of lifting from 2,000 to 10,000 lb. The magnets have a power consumption of from 250 to 500 W at voltages ranging from 12 to 64 to coincide with the existing truck battery unit.

Rapid Magnetic, Ltd., were also showing lightweight lifting magnets incorporating aluminium windings for use on fork lift trucks. Other exhibits on this stand included a clover leaf magnet for handling coiled steel strip, magnetic elevators and conveyors, a range of permanent magnet concave rolls for tube or pipe handling during manufacture and galvanizing or plating, and magnetic clutches, brakes and separators.

An automatically controlled lifting magnet could be seen handling steel plates and scrap material on the stand of Electromagnets, Ltd. A static exhibit on this stand was the 'Boxmag' packaged unit display which included all the components necessary for converting mobile cranes for magnet operation. An inclined conveyor embodying a magnetic conveyor head unit and fitted with an overband-type magnetic separator was also shown. The drive from the conveyor motor was transmitted through a magnetic clutch and material was transferred to the conveyor from a vibratory feeder exhibited by their associates, The Blending Machine Co., Ltd. This company was also showing a 'Blencut-Scee' electronic counting and batching unit operating in conjunction with a bowl-feeder handling copper washers.

Electro-magnetic couplings in which the torque is transmitted through a ferrous powder which when energized links an inner and outer rotor so that a solid drive is achieved without slip were shown by S. Smith & Son (England), Ltd. The torque is accurately controlled by, and is a direct function of, the value of the exciting current and is entirely independent of speed. If the torque for a given excitation is exceeded, slip will take place providing a safety factor against overload and a characteristic which can be used, with certain limitations of heat dissipation, in tensioning devices. Models ranging from $\frac{1}{2}$ to 211 lb/ft torque capacity are available. All couplings operate from 24 V or 180 V D.C. as standard, although special units for operating from other voltages can be supplied.

250 A 'Trolleymaster' busbar. E.M.S. Electrical Products, Ltd.

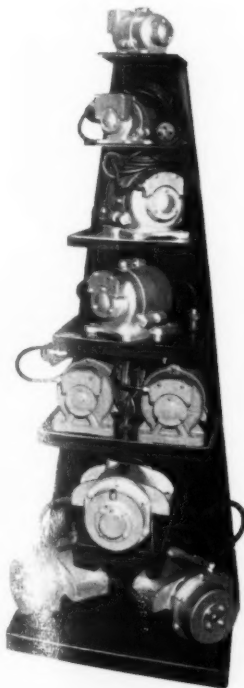


A recent introduction in mechanical handling equipment has been driverless trolleys controlled either by a wire or painted track on the ground. A demonstration of the first system was to be seen on the Conveyancer Fork Trucks, Ltd., stand. This company has recently concluded a marketing arrangement with E.M.I. Electronics, Ltd., and under this arrangement the 'Robotug' electronic-driverless trolley system is being fitted to the Conveyancer-Scott vehicles. The basic E.M.I. 'Robotug' electronic-guidance system is controlled either by a wire laid on the surface for temporary routes or embedded in the floor for permanent installations. An A.C. current of a predetermined frequency is passed through the wire and two sensing coils, fixed in front of the trolleys, pick up the signal currents from the magnetic field and keep the truck on the desired path. Each trolley has a control unit into which an operator can programme the necessary constructions to make the trolley call at up to 75 different points for loading or unloading. Arrangements can be made to call at more points if desired. When restarted at the last of these, the trolley automatically returns to its original destination. More complex systems employing a number of 'Robotugs' over a variety of routes can be provided. These employ a 'block' system whereby the track is divided into a number of sections. These blocks are de-energized or 'dead' but, as a trolley proceeds, the section in front of it is energized by a control unit mounted on the trolley itself. At the same time, the control unit de-energizes the block immediately behind the trolley, thus ensuring that two 'Robotugs' on the same route will always be separated by a minimum of one block. This block system was demonstrated for the first time at the Earls Court Exhibition.

The other system for controlling driverless trucks, i.e. a line painted on the floor, could be seen on the Conveyancer Fork Trucks, Ltd., other stand on the first floor. This system was developed in conjunction with Hunting

Engineering, Ltd., and has been given the designation A.L.F. (automatic line follower). The A.L.F. system incorporates photo-electric cells in the control unit on the truck and is designed to make the truck follow a white line on a black background or a black line on a white background. The command signals at the various stations consist of a series of lines painted on the floor, the position and number of these lines conforming to a prearranged code. The truck identifies the station by reading these coded signals from the floor and, as the system does not count stations along the route by using an indexing method, it is not susceptible to missing a count as it proceeds, thereby upsetting the control sequence. Rapid route revision can be carried out by repainting a new route in a relatively short time. Route setting can be achieved by either simple switching, route tablets

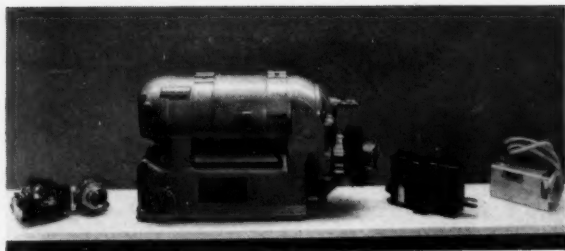
A range of rotary electric vibrators.
E. P. Allam & Co., Ltd.



A large 'Liftmaster' magnet shown by Rapid Magnetic, Ltd.

operating switches, or punched cards according to the complexity of the route. A remote manual control is provided so that the truck can be manoeuvred by an operator away from its track line. The track in its present form is a flat platform type with, normally, front wheel steering and rear wheel drive. The power is supplied from a lead-acid battery (which also feeds the electronic control gear) carried by the truck. Two guidance boxes are mounted on the truck, one ahead of the front wheels for forward running and one behind the rear wheels for reversing. Each box contains search, contrast and control photo-electric heads, a proximity detector and amplifiers. The search head traverses the truck to follow any deviation of the track line from the centre line of the truck and a signal proportional to the deviation is used to control the steering. The control head picks up a reflected pattern of information when the truck reaches a station or 'point of decision'. The truck is also fitted with a relay box containing a command switching panel, a fault panel and a delay switch. All commands are stored in this box and released when the appropriate command signals are received at specified points, for example, to effect change of direction to branching routes. The delay switch is used in conjunction with the proximity detector to stop the truck if there is an obstruction in the line of travel.

The use made of portable electrically powered apparatus in the mechanical handling field was emphasized by the number of stands devoted to batteries and battery chargers. A range of automatically controlled charging equipment using selenium, germanium or silicon rectifiers to suit various loadings was displayed by Legg (Industries), Ltd. One of the models on display was a recently introduced two-step charger for maintaining 20 lead-acid cells, having a starting rate of 90 A. Traction batteries in which the positive plate is held in a multi-tubular 'gauntlet' of resin-impregnated Terylene cloth were shown by Chloride Batteries, Ltd. In addition to being resistant to sulphuric acid and oxidation, Terylene combines great tensile strength with remarkable elasticity. It also enables the electrolyte to penetrate to the active material more freely, whilst shedding of the active material is reduced to negligible proportions. The bottom of the positive plate is a polythene moulding of special design to ensure that the tubes of the 'gauntlet' are effectively and permanently sealed. It also has the advantage of serving as an insulator and is not subject to corrosion. The use of plastics results in a battery which gives up to 35 per cent more power in the same space and with the same weight.



Industrial actuators shown by The English Electric Co., Ltd.

The display on the D.P. Battery Co., Ltd., stand typified their wide range of cell sizes in capacities from 42 to 1,330 A/hr. Included in these was their new 'N' range of cells which are specially designed for heavy-duty applications where the highest possible capacity is required in a limited space. Alkaline traction batteries of both the nickel cadmium and the tubular positive plate nickel iron types were displayed by Nife Batteries. These batteries are of all-steel construction which gives great mechanical strength with outstanding resistance to shock vibration. The cells of both types are held by ebonite suspension boss insulators in crates of seasoned hardwood. The plate construction prevents any loss of active material and the alkaline electrolyte is a preservative of steel. Basically, the plate construction comprises finely-perforated envelopes for the positive and negative plates of the nickel cadmium cells and perforated tubes and envelopes for the positive and negative plates of the nickel iron cells. Both batteries have high capacities at high rates of discharge and they can be fully recharged in seven hours or less and given boost charges if necessary. The cells give off no obnoxious fumes and will work in very cold conditions. They will also stand idle without damage for indefinite periods.

A range of batteries for industrial trucks was shown by Oldham & Son, Ltd. These included sectioned examples to illustrate their P.g. double-sleeve multi-tube construction. Each P.g. plate consists of a series of perforated p.v.c. outer sleeves, lined with braided glass fibre inner sleeves, sintered on a grid structure of rigid 'X' metal alloy splines. This special plate construction gives a greater capacity than is possible with ordinary methods of positive plate construction, as it enables considerably more active material to be packed between the metal spline and the glass fibre sleeve. The closely-woven glass fibre sleeves become securely embedded in the active material and thus offer a more secure support so that shedding is virtually eliminated. This firm also introduced a new charger for traction batteries at the Earls Court Exhibition. Both taper and two-stage chargers are available with characteristics meeting the requirements of B.S. 2550. A single-phase supply is fed via a double-wound vacuum-impregnated transformer with earth screen and six primary tappings to a set of germanium rectifiers. Protection on the A.C. side is effected by a high-speed circuit-breaker and a high-speed fuse is incorporated in the D.C. output. The charge is terminated in both versions by a relay which is also used in the two-stage model to operate the contactor for changing the charging rate.

A system of electrical conductors enclosed within a casing so constructed as to prevent any accidental contact with live metal and movable trolley connectors for supplying power to various types of equipment or tools not fixed in

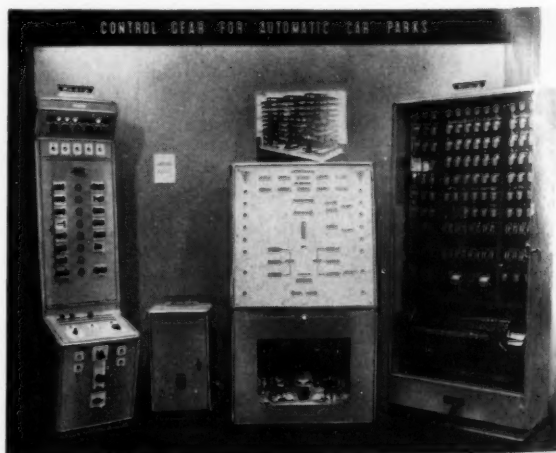
position was shown by E.M.S. Electrical Products, Ltd. This system, the 'Trolley-master' enclosed collector track system, gives complete protection from accidents due to contact with exposed conductors on low head hoists and crane cross spans. It consists of a housing for the conductor rails which are supported on insulators at suitable intervals. The trolley collectors run inside the housing and a fusebox connected to the trolley projects below the track system.

A pneumatic tube transmission system was shown by Dialed Despatches, Ltd., consisting of a single unplasticized p.v.c. tube ring main. Up to 45 separate stations can be operated with intercommunication between all the stations. Letters, documents and papers or any small articles fit into the 1.8-in diameter cylindrical carrier and are passed through the system at speeds of between 20 and 30 m.p.h. The carriers are homed to their stations by a simple switching arrangement known as the dialling head which is mounted in the rear of the carrier body. The act of dialling means that a tuned reed is set to vibrate at a particular sonic frequency as the carrier passes through the tube. The note emitted by the reed is generated by the passage of air over the reed and this note is picked up by a microphone situated at the approach to each station. This microphone is coupled to a tuned circuit and amplifying system. If the note emitted is of the same sonic frequency as the tuned circuit, the amplifying system operates an electronic relay which in turn operates a diverter so that the carrier is deflected into the receiving unit at the station.

On Felco Hoists, Ltd., stand, details were available of the lapsed time indicator manufactured by Cass & Phillip, Ltd. This device consists of an electrically-controlled chronometer escapement which accurately records the working hours and minutes of any type of equipment. It commences to record immediately the machine or equipment is put into operation and stops immediately this activity ceases. The instrument can be directly connected into the electrical connection made to the driving motor-control circuit of battery-electric vehicles or it can be controlled via pressure switches.

A magnetic wire rope defectograph was shown for the first time at the Exhibition by British Ropeway Engineering Co., Ltd. The unit can be installed either at some suitable vantage point with the moving rope travelling through it or the unit can move whilst the rope remains stationary. The existence of a flaw, even in the internal construction of the rope, can be detected by this instrument.

Three control panels for automatic car park. Sharp Control Car, Ltd.





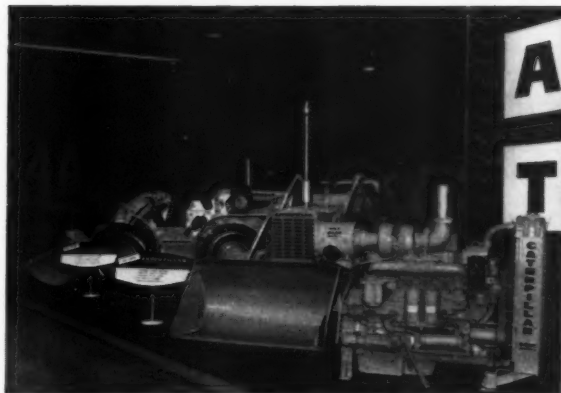
EXCAVATORS AND EARTH-MOVING EQUIPMENT

IN RECENT years there has been an astonishing development in the design and performance of earth-moving plant generally, brought about by three major factors. These are hydraulic control of all movements; oversize pneumatic tyres, enabling heavy vehicles to travel over very soft ground without any trouble; and the advent of the highly successful commercial oil engine, brought about by the combined research of Dr. Rudolf Diesel, Herbert Akroyd Stuart and many others.

One of the highlights of the Exhibition was the Massey-Ferguson tractor-digger-shovel, a most versatile equipment, as borne out by the following example of a recent job. The task was to construct a playing ground in only one day, which may appear on reflection to be impossible, for the Lawrence Weston School, Bristol. Work started at 8 a.m. with two Massey-Ferguson diggers and ten Massey-Ferguson tractors; drain trenches were excavated by the diggers, the land was ploughed and prepared for seeding, all ready for two football pitches and a cricket pitch by 8.30 p.m. A truly remarkable performance, when we consider that the work was carried out over an area of some 6½ acres.

This shovel has been designed for the digging of a full depth trench alongside a building face, wall or fence with a tractor-mounted machine; the three-position mounting on the main digger frame allows the digger to work on the extreme right or left as well as in the centre. Another interesting design feature is provided by the vertical stabilizers which are individually retractable for levelling-up on slopes or tilting for bell holes. The vertical design eliminates excessive cylinder pressure and possible pin breakage, a common fault with the conventional splayed stabilizers. Vertical stabilizers will keep the overall width of the unit to a minimum, a very important feature when working in confined areas. Very rapid action is achieved with the Massey-Ferguson rotary cylinder, which has a one-piece shaft and vane to provide a working arc up to 200 deg; it is claimed that the design of this cylinder provides a far quicker and more precise control than a conventional type. The large adjustable seat always slews with the digger boom, a feature of great importance to the operator, for whom it means much less fatigue, with quicker and more accurate working; moreover, he faces the bucket at any angle within the arc, which means that he is always facing his work.

The Matbro Mastiff provides another outstanding example of very fine engineering design in this important field. This is claimed to be the first British four-wheel drive and steer loading shovel to be exported to North America; it is powered by a Ford diesel engine of 96 h.p. at 2,250 r.p.m. with six cylinders. Steering is of full power centre-point articulated type, controlled by a conventional steering wheel, fed by separate hydraulic pump, valve and follow-up



A view of the Caterpillar stand showing the 855F Traxcavator and with the new 944A left. Caterpillar Tractor Co., Ltd.

system. With a calculated tractive effort of more than 25,000 lb, this machine can dig at right-angles in a narrow trench, and then be used like a swing loader.

An important design feature is the single universal joint at a position in the hydraulic transmission line of comparatively low torque; as compared with the extremely high torque in the driving wheels. The two non-steering axles are put into a radius by the steering wheel, through the action of hydraulic rams. The usual troublesome, highly stressed components like king pins and track rods, drag links and drop arms, as well as hub universal joints, are eliminated.

It is claimed that this is the first time that a rubber-tired loader has the same performance as a crawler tractor, yet with the manoeuvrability and power in restricted operating conditions which are so useful on construction sites. The standard bucket capacity is 1½ cu. yd., but other buckets are available with capacities of ¾ cu. yd. and 3 cu. yd. respectively. Thrust at the bucket hinge is 11,000 lb and the bucket break-out force is 17,000 lb; the lift time is 7 seconds and the lowering time is 4 seconds.

The David Brown 50 TD front end shovel mounted on a crawler tractor is a very versatile tool applicable to a wide variety of working conditions, and particularly suitable for operation on soft ground. The drawbar pull at a rated engine speed of 1,600 r.p.m. is 35.5 h.p., and the belt horse power at 1,800 r.p.m. is 44.7. The standard bucket capacity is 1 cu. yd. struck or 1½ cu. yd. heaped measure; alternative buckets are of ¾ cu. yd. and 1½ cu. yd., struck and heaped measure respectively. Suitable alloy teeth can be fitted to

the buckets as an extra item. The dumping height from the centre of the hinge pin to the ground is 10 ft 6 in and the dumping clearance is 8 ft 3 in. The machine is capable of a maximum digging depth below ground level of 16 in.

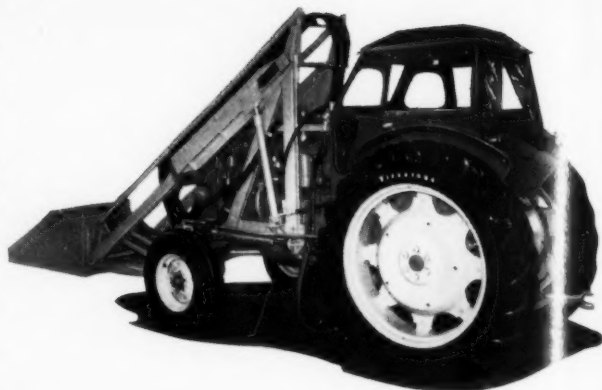
Alternative attachments for this tractor unit are the following, namely: an angled dozer blade, a fork lift attachment, a logging clamp, scarifier teeth and rear-mounted ripper. This latter fitting is very useful for breaking up hard ground before excavating. There are 33 track shoes on each side and five track rollers, the width of the standard track shoe being 14 in, and the gauge of the track 56 in.

Several interesting design features are embodied in the many and varied equipments made by the Caterpillar Tractor Co. The new D4 Series C crawler tractor with bulldozer equipment has an integral hydraulic system that eliminates unwieldy externally mounted controls on the front of the tractor. The tank mounted in a protected position behind the engine, permits convenient location of the hydraulic pressure lines to the bulldozer or implement cylinders. The efficient vane pump is completely sealed in order to prevent the entry of dirt which may cause wear. A choice of three hydraulic circuits gives complete flexibility to meet all requirements.

The operator's seat is placed high in order to give all-round visibility, and the tractor-mounted tools are always in full view, so that work can be done rapidly and accurately. For normal applications, the standard heavy-duty dry-type clutch gives good service, but for exceptionally heavy work it is recommended that the oil clutch should be used. Oil, delivered under pressure, circulates between the clutch plates, keeping them separated until the last moment before engagement. Even under the heaviest working conditions, the clutch is cool running.

Power is provided by a four-cylinder 65-h.p. Caterpillar diesel engine. This is fitted with a dry-type air cleaner claimed to keep out 99.8 per cent of the dirt under any conditions, however severe, yet this air cleaner can be serviced in only five minutes and it does not require any oil. There are five forward and four reverse speeds, so that maximum efficiency can be achieved on any job. The track exerts a pressure on the ground of about 6 lb./sq. in.; the high ground clearance, coupled with a clean underside speeds up operations over deeply rutted ground, or ground covered with debris, as well as in soft footings.

The No. 944 Series A Traxcavator made by the same company is a new wheeled loader with many interesting features. This machine runs on four pneumatic-tyred wheels and has a wheelbase of 88 in. Power is provided by an engine of 105 h.p., which may be either a turbocharged



Stanhay-Shovelall hydraulically operated shovel. Stanhay (Ashford), Ltd.

diesel unit or a petrol engine; the number of cylinders is four and six respectively. A bucket of 2 cu. yd. capacity is fitted, and the break-out force is 17,500 lb. Hydraulic power is provided by a vane pump with a capacity of 44 gal/min at a pressure of 1,000 lb/sq. in.

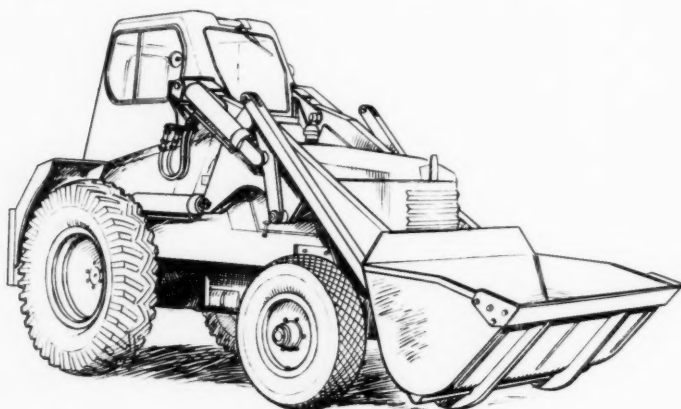
The steering system has been designed to give very precise control and to retain it, even at road speeds. There is exceptionally heavy linkage throughout and the steering rods are mounted on a centre pivot. This design allows the steering rods to oscillate with the axle, thereby maintaining an accurate wheel line over uneven ground. Oscillation of 18 deg allows one wheel to drop or rise as much as 11½ in, keeping all wheels on the ground. A fibreglass cab is available to give comfortable working conditions in bad weather.

Control of machine direction and speed is afforded by two control levers, the forward-reverse lever being located to the left of the steering column. The steering system is hydraulically boosted, axle oscillation of the steered wheels being accomplished by the use of a centre point system, with oscillation pivoting on the centre of the axle. Thus, with the tie-rod pivot points located near the centre of the axle housing, minimum steering wheel correction is required because of oscillation.

Careful attention has been paid to ease of maintenance, a very important feature on construction work. Routine engine servicing is performed by removing the engine side panels and rigid protective fenders, which cover the unit's wheels and extend along the sides of the engine, serve as working platforms for engine servicing. The machine's front guard consists of seven bolt-on pieces which are easily removed for servicing the lift cylinders, hydraulic manifolds and brake master cylinder. In the operator's compartment the seat can be tipped forward for protection from weather, and to provide access to the transmission filter, control valve, and loader pump, as well as for control linkage adjustment.

A complete range of Traxcavator attachments is available. A side dump bucket of 2 cu. yd. capacity is the same as the standard bucket, and extends 20 in to the outside of the left front wheel, so that dumping can be done to the left side

The Muir-Hill RD2 loader, artist's impression. E. Boydell & Co., Ltd.





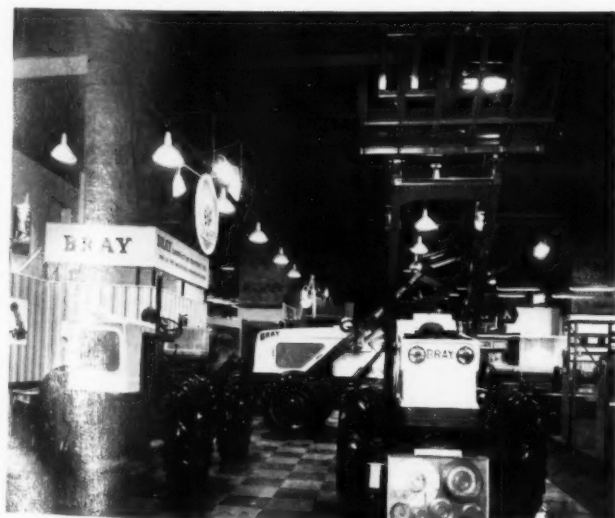
ABOVE
The Muir-Hill RD2 loader. E. Boydell & Co., Ltd.

BELOW
Matbro Mastiff model 6/90, 96-b.h.p. loading shovel. Matbro, Ltd.

BOTTOM
The Bray exhibit included three tractor shovels, the HL loading shovel and Centaur tractor seen on the left. Bray Construction Equipment, Ltd.



ABOVE
Type 64 hydraulic loading shovel seen on the stand of Weatherill, Ltd.



with minimum manoeuvring of the machine. Another attachment is a light material bucket with a capacity of 3 cu. yd., recommended for handling material which weighs less than 2,000 lb/cu. yd. Its increased capacity is provided by increasing its width, which retains maximum ground clearance under the cutting edge when dumping. A quarry bucket of 2 cu. yd. capacity is also available; similar in basic construction to the standard bucket, this has reinforcing metal plate along the entire underside. Bucket teeth, with replaceable tooth tips, are available for the standard bucket.

Three new additions to the Muir-Hill range of hydraulic loaders were on view on the stand of E. Boydell & Co., Ltd. Designated as the RD2, the DF2 and the FD4, these machines have several new design features which make for faster operation, greater load-carrying capacity and reduced wear and tear. The FD2 machine has front-wheel drive and is claimed to be ideal for downhill loading and for working in loose material like sand, because its backing out performance is greatly superior to that of conventional loaders. The FD4, which has four-wheel drive, is said to overcome very adverse ground conditions with great success and is arranged so that the drive to the rear wheels can be disconnected if required. The RD2 is a versatile general purpose loader which completes the range.

All three machines are powered by a Fordson Major four-cylinder diesel engine, developing 56 brake horsepower at 1,800 r.p.m.; there are six forward speeds and two reverse speeds, final drive being through a double-reduction driving axle with a four-pinion differential and spur pinions and gears. The tip and reset of the bucket are operated by double-acting hydraulic rams with pistons $4\frac{1}{2}$ in diameter; hydraulic power is provided by a gear-type pump driven through Hardy Spicer coupling from the engine crankshaft, high-pressure fluid passing through a double selector controlled by twin levers.

All three equipments provide a height of lift under the lip of the tipped bucket of 11 ft with 12 ft 11 in clearance under the bucket hinge. Maximum outreach is 5 ft 10 $\frac{1}{2}$ in for the RD2 model and 5 ft 5 $\frac{1}{2}$ in for the FD2 and FD 4 machines.



Massey-Ferguson 710 rear-mounted digger in operation. Massey-Ferguson (Gt. Britain), Ltd.

Maximum lift height of the beams is controlled by a limiting device to prevent strain being imposed on the hydraulic system.

Manœuvrability is another outstanding feature of this new range of loaders; the turning circle of the RD2, for example, is only 30 ft. Buckets are fitted with abrasion-resistant blades and check plates. Extras available include power-assisted steering and hydraulic transmission embodying a torque converter coupling and epicyclic gearbox instead of normal clutch and gearbox.

The latest addition to the Weatherill hydraulic loading shovels is the 64 model, powered by a Rootes three-cylinder diesel engine of 108 h.p. at 2,000 r.p.m. The machine has four-wheel drive with planetary reduction on all four wheels, compressed air brakes, and power shift transmission with four forward speeds and four reverse speeds. The shovel mechanism is fitted with patented automatic scoop levelling with pre-set controlled digging angle; there is no load on the hydraulic rams during digging, and the break-out force is increased as the crowd increases. All digging loads react at points within the wheelbase and therefore provide for very considerable tyre adhesion; all rams, when loaded, are in compression, and by having complete scoop crowding, the crowd arms are always in tension. The axles have been specially designed for these loaders.

The bucket has a heaped capacity of 2 cu. yd. and a struck capacity of 1½ cu. yd.; the lifting capacity for a safe working load is 5,000 lb, and the raising and lowering times for the loaded bucket are 8 seconds and 3½ seconds, respectively; the maximum digging depth is 10 in.

Priestman Brother of Hull have a world-wide reputation for grabs of all types and sizes and, in fact, they have manufactured something like 4,000 different models over a period of some 80 years. Grabs are very useful in civil engineering construction for carrying out trench excavation at depths

greater than are possible with back actors and similar machines. The three main factors governing the choice of a grab are the material to be handled, the lifting equipment available, and the working conditions on site. Correct jaw design is a very important feature in efficient handling, and there is an infinite variety of lifting and hoisting equipment from which grabs can be operated, including small mobile cranes, ships derricks, overhead cranes, telfers, runways, transporters and large dockside cranes. No single mechanism for closing the grab on the material, hoisting the loaded grab, and then dumping the material where it is required, can possibly suit such a wide variety of suspension arrangements. It is this fact, coupled with the limitations imposed by the materials and the conditions on the site, which makes necessary so many combinations of grab-operating mechanism and individual types of jaws.

The narrow heavyweight type of grab is particularly suitable for excavating work in trenches. Its powerful digging action is concentrated on a short lip and the inset hinges allow for narrow trench working. The jaws have been designed for speedy discharge, the teeth being self-clearing. Another very successful design is the air cactus grab, which was employed on a world record shaft-sinking project in South Africa. This grab is fitted with a double-acting compressed-air cylinder giving fast-clawing action; the guarded rotary valve ensuring complete control by the operator; a relief valve eliminates any opening shock. The holding rope is fixed to a centre girder which enables the winch driver to spot the load at minimum height above the hopper during shaft sinking. The six blades are of all-welded construction and are provided with tungsten carbide tips in weld metal; the piston rod is of high-tensile steel. A grab of this type was used in conjunction with a Pye television camera for recovering the wreckage of an aircraft in the Lake of Geneva.



HOISTS, LIFTS AND STACKERS

New and improved designs of vertical lifting and lowering equipment introduced at Earls Court not only offer the means of saving still further time and manual effort but show advances towards providing better control and greater safety for operators. In some cases, too, additions to existing ranges have been made to afford increased hoisting capacity for well-tried basic designs. A fact very apparent from a comprehensive survey of the stands is that users now have a very wide choice of some types of lifting equipment. In some cases the majority of those available are very similar in general design, but merit individual attention by reason of one or more exclusive features of practical value, either by affording increased efficiency and reducing labour or by widening the field of application.

A noticeable development, no doubt attributable to the rapid increase in the number of multi-storey buildings erected in this country, is the introduction of new or modified equipments for raising materials and workmen to considerably greater heights during constructional operations and for facilitating their maintenance and cleaning after erection. One example illustrating this tendency was the new prominently displayed Skymaster Mark 2 electric man-carrying hoist installed by A.C.E. Machinery, Ltd., on the exhibition information stand of this journal at one end of the Main Hall where it was in constant use for taking personnel to and from the first floor.

It is designed to lift 1 ton or 12 persons at a speed of 100 ft/min. A larger model supplied can raise 2 tons or 20 persons at 300 ft/min. Four have been supplied for raising men and building materials to heights up to 500 ft. For heights up to 80 ft this hoist is self-supporting on a suitable base platform, but for higher lifts it requires to be tied to the building by scaffold tubes at 50-ft spacings.

A new working platform for high building operations is the Wall Spider shown by Access Equipment, Ltd. Of tubular steel construction with removable timber platform measuring 6 ft x 2 ft 3 in, this has a safe working load of 500 lb or two men with tools, and a nominal hoisting and descending speed of 40 ft/min. It weighs 560 lb, less cables. It can be installed with a rotatable suspension arrangement for cylindrical structures, such as oil storage tanks and chimneys, and for traversing horizontally over a building face, using 'T' section tracks above and below. Removable telescopic wheel mountings top and bottom allow the cage to travel vertically or horizontally and also to be lowered on the ground.

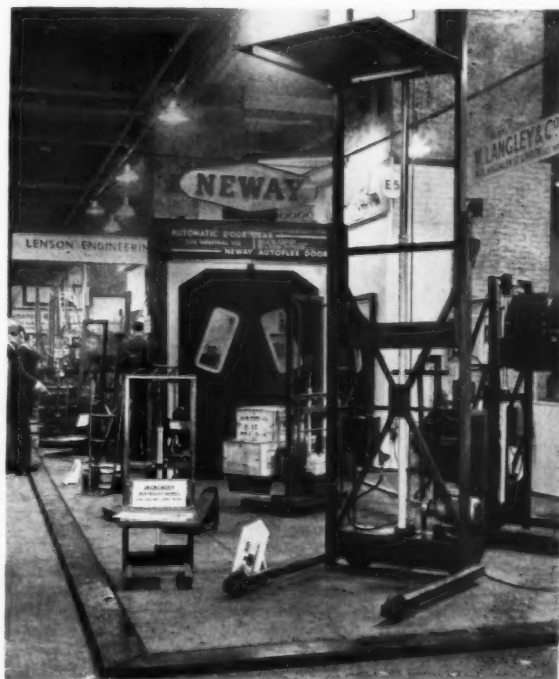
Enclosed under the platform is a Demag 2-h.p. electric motor and disc brake combination, giving automatic braking in the event of power failure, and there are limit switches top and bottom. An exclusive feature is an automatic dual rope safety device which secures the platform in the event of hoist cable failure. A 10-in cable drum has

a capacity for 150 ft of cable which has a breaking strength of 6 tons. The breaking strength of the safety cable is 9 tons, giving a safety factor of 18 : 1.

High lifting rates of 12 to 14 ft/min are achieved by the use of a pair of the new SGB Strateline hand-operated self-sustaining cradle winches supplied by Varatio-Strateline, Ltd., with 110 ft of galvanized pre-formed special plough steel cable for winding working cradles up and down against high buildings. Manual effort is minimized by the use of hypocycloidal gearing and ball and roller bearings totally enclosed and grease-packed. They have a safe working load of 500 lb and, by the use of heat-treated aluminium alloy for the casing and drum, the weight is only 39 lb. When a winding operation is completed, the mechanism automatically locks and instantly sustains the load. A time-saving feature is the re-reeling mechanism for quick run-off and re-wind of the cable. By removal of a screw and movement of a small lever the drum can be rotated at 1:1 ratio. This also facilitates cable inspection and replacement.

A similar safety feature is incorporated in the new electric

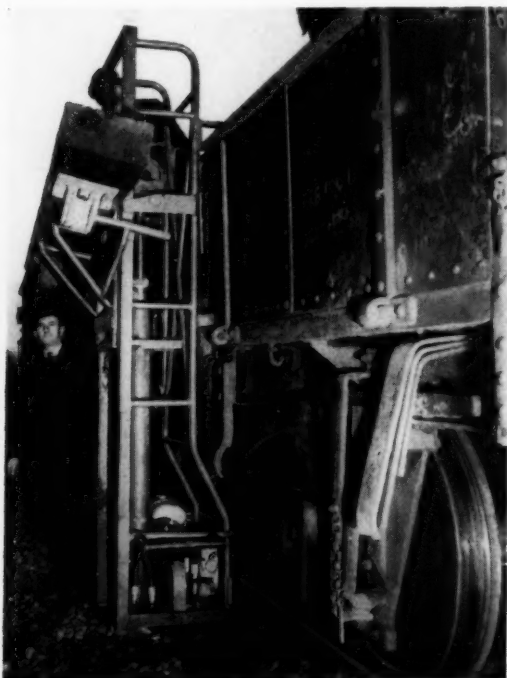
Hand-propelled Jacacaddy lifting tables shown by W. Langley & Co., Ltd.





(Above) General view of stand showing overhead crane and many different types of pulley blocks. Herbert Morris, Ltd.

(Below) The new Brimpex sleeper lifter hung on the side of a railway wagon. Industrial Machine & Equipment Co. (Brimpex), Ltd.



winch, not exhibited, specially developed for Palmer's Travelling Cradle & Scaffold Co., Ltd., for handling their Palmatic working cradle. This has two drums, one for lifting each end of a cradle, on either side of a central drum that controls the electric cable. There are push-button controls on the winch and on the jib operated on the roof of the building. Trip devices above and below the cradle bring the mechanism to an immediate stop if an obstruction, such as a suddenly opened window, is encountered. Manual winding gear is also provided for lowering the cradle in the event of power failure.

The exhibition included a number of new and improved designs of lifting equipment for saving time and man-power in overhead, storage, stacking and other operations. A distinctive feature of the new Lenson Hystorer slave platform elevator introduced by the Lenson Engineering Co. is particularly suited to storage requirements. It has two elevating platforms, one for the operator and the other for the load to be handled. These are raised by separate hydraulic rams, individually controlled, with power provided by an electrically driven pump mounted on the tubular steel base frame. The operator is thus able first to raise himself to a position required and then raise or lower the load platform to the most convenient handling height. The elevator can handle loads of 30 lb to 100 lb stored in racks up to 14 ft in height. Measuring 2 ft wide and 12 ft high, it can be employed in narrow gangways, and is fitted with castors for easy movement.

The new Lenson H type mobile working platform can be supplied in any size up to 12 ft long by 4 ft wide. Vertical adjustment is obtained by means of a hand-operated hydraulic pump mounted on the platform, a hydraulic ram on the base frame, steel cables and suitably placed pulleys. A load of 5 cwt can be lifted to a working height

of 10 ft. Of welded tubular steel construction and fitted with handrails, it is equipped with rubber-tyred castors and can be easily moved by one man. Heavier loads can be raised by a similar mobile platform powered by a single-phase motorized hydraulic pump unit with push-button control.

An entirely new design of hand winch, giving a fast rate of lift, is fitted to the new Quik-Lift mobile hand elevator produced by Powell and Co. It is available in capacities of 150 lb, 250 lb and 350 lb, with lifting heights ranging from 4 ft to 10 ft. The platform measures 21 in long by 21 in wide, and the load is automatically held stationary when the winding handle is released, neither brake nor ratchet and pawl mechanism being necessary. Two models are available, one with two front wheels and two rear castors, with rubber tyres if required, and the other with 8 in rubber-tyred wheels. Other models to lift sacks are also supplied.

Introduced at this year's exhibition by Industrial Machine and Equipment Co. (Brimpex), Ltd., the Auto-valve 2½-cwt electric, petrol or propane gas-engined lifter has both fully automatic action and hand valve control, achieved by use of the same patented ram, and is also fitted with a foot trip starter. With automatic operation and powered by a propane gas engine it can raise 60 tons an hour, using eight pennyworth of gas. For semi-automatic lifting, after loading, the foot trip starter is pressed to engage the automatic action, while with hand valve control the load can be inched up or down by operating a lever. Like other Brimpex lifters, the machine has nylon-coated rust-proofed cable.

Developed originally for British Railways, the new Brimpex self-actuating hydraulic sleeper lifter has a light welded steel tubular frame so that it can be readily hung on the side of a railway wagon. It is powered by a 1-h.p. J.A.P. petrol engine, and in operation the cradle is raised above the top of the frame so that sleepers can be easily discharged. In use, it is found that it enables four men to do the same amount of work previously performed by eight.

Another new Brimpex production is an interfloor lifter which will raise 7 cwt up to 25 ft above floor level at a speed of 40 ft/min. It can be supplied powered by electric motor, petrol or gas engine or hand pump. It is a rigid-frame self-standing structure and needs only to be bolted to the floor. Interlocking vertically sliding safety gates can be supplied. A patented hydraulic ram requires no topping up, and a pre-set relief valve prevents overloading. The standard platform measures 20 in × 14 in and has a 20-in high back plate, but these dimensions can be made to suit requirements.

(Right) New 1-ton lifting platform. Conveyancer Fork Lift Trucks, Ltd.

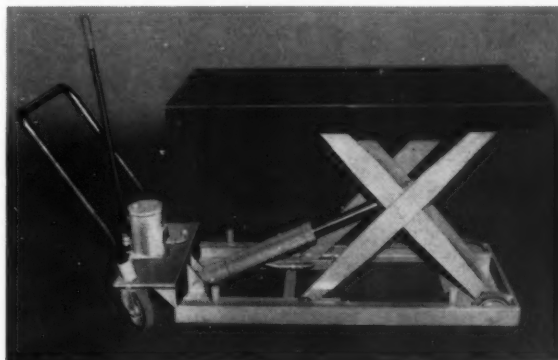
(Below) The Newton Hydratrak lifting table. Power Jacks, Ltd.



Lenson Hystorer slave platform elevator. Lenson Engineering Co.



(Below) Bicep hand-operated lifting table. Access Equipment, Ltd.



Drums up to 500 lb in weight can be raised by the new Lodematic hydraulic telescopic stacker manufactured by Lodematic, Ltd. Measuring only 28 in wide, this has a foot-operated hydraulic ram, but mains or battery electric models are also available. It has two lifting speeds for heavy and light drums respectively, and by means of a conveniently placed knurled knob the lower speed can be controlled and the descent stopped to discharge or receive a load in any required position for loading or unloading operations. The straddle arms are fitted with wheels running on needle roller bearings and oversize wheels, for movement over uneven ground or long distances, and a parking brake can be fitted. Smaller models for die set handling are also available.

A feature of the new Lodematic B type electric high-speed automatic sack lifter is that a load of 2½ cwt can be raised to any height required up to 6 ft. This is achieved by means of an adjustable stop that can be secured in any position on a vertical rod. Immediately a fork rising with the platform makes contact with this the power is cut off. Petrol-engined and mains electric models with lifts up to 10 ft and a semi-automatic model with 14-ft lift are available. If required also, a counter for tallying the loads can be fitted.

The latest improved Sherpa Model 10 stacker produced by Salisbury Precision Engineering, Ltd., is of the telescopic type with lifting capacity of 300 lb at 12 in centres. The 24-in forks can be raised from a height of 3½ in to 9 ft, and in the lowered position an overall height of 6 ft permits standard doorways to be negotiated. With battery operation the lifting speed is 20 ft/min and with mains operation, 25 ft/min. By hand, full lift is achieved in 30 seconds. Tandem front wheels with needle roller bearings are fitted to facilitate movement over floor irregularities, and roller bearing castors give a turning radius of 40 in. Standard attachments available are a platform plate, jib and hook, dual sprag brakes and Phenolic or had rubber-tyred wheels in place of cast iron.

For lifting loads up to 20 cwt the Eccles telescopic stacker shown by Eccles (Birmingham), Ltd., is supplied in straddle

and non-straddle types with fork lifts up to 150 in with overall height of 157½ in. Mains or battery electric pump models are supplied, and the standard 24-in or 36-in forks can be fitted with a detachable steel platform. The lifting speed with full load is 12 ft/min at 18 in centres. Fitted with overload valve and variable-speed relief valve, both models cut out automatically when maximum height is reached. Cast iron or Duthane- or rubber-tyred wheels are fitted, and the hand drawbar can be secured in the vertical position for easy manœuvring in narrow gangways.

The Angel Truck Co., Ltd., have introduced a new range of mobile stackers, that are extremely light, manœuvrable in confined areas and low-priced. These are the Trolifters Mark II, of which the simplest is a hand-winch-operated model of 3 cwt load capacity with lifting height of 4 in. Pawl and ratchet mechanism sustains the load, and lowering is controlled by a hand brake. It is fitted with two 4-in castors and two 5-in rubber-tyred wheels. A similar model of the same load capacity is actuated by a Lake combined jack and ram, while a two-speed 3-4-cwt model is operated by a double-action Linford pump and ram.

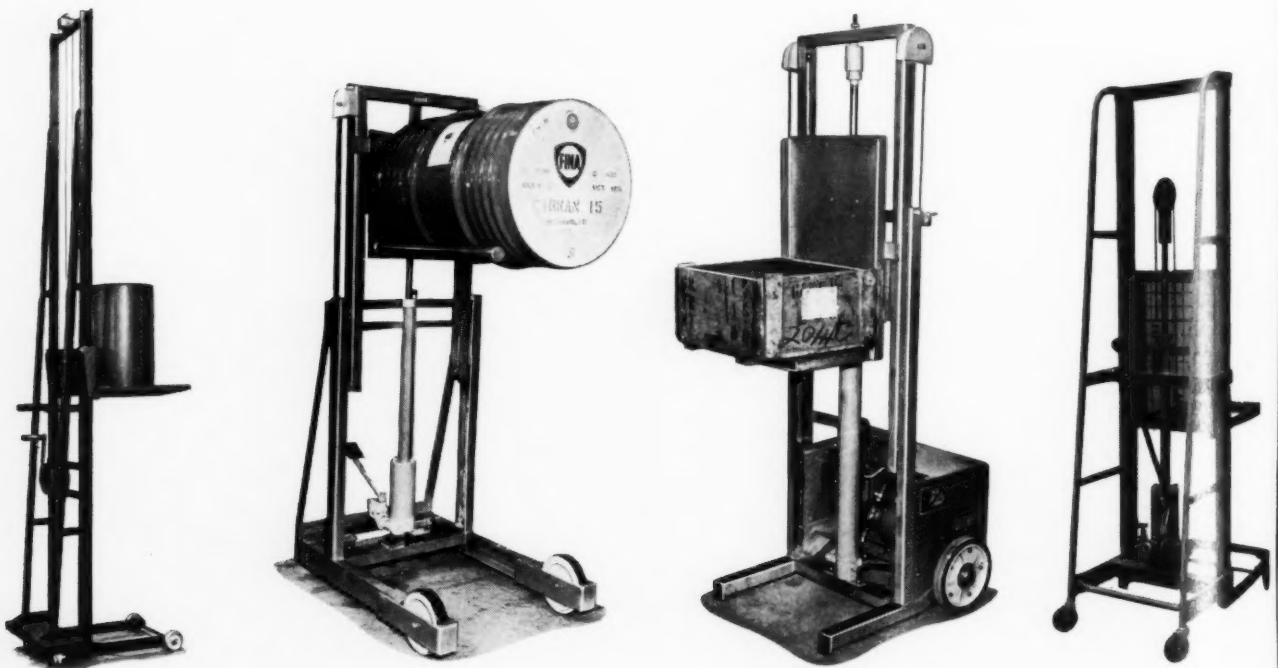
Several makes of hydraulic lifting tables having distinctive features of interest were exhibited for the first time. Of two 1-ton electro-hydraulic examples by Conveyancer Fork Trucks, Ltd., one has a 56-in × 19-in platform that is raised from a closed height of 6 in up to 36 in by a single-extension jack, and the other, with 56-in × 32-in platform, is raised from 15 in to 60 in by a double-extension jack. Single-extension models of 2, 4, 6 and 10 tons capacities, and with larger platforms have one, two, three and four jacks respectively, while two, three and four jacks are used for 2-, 3- and 4-ton double-extension versions. In

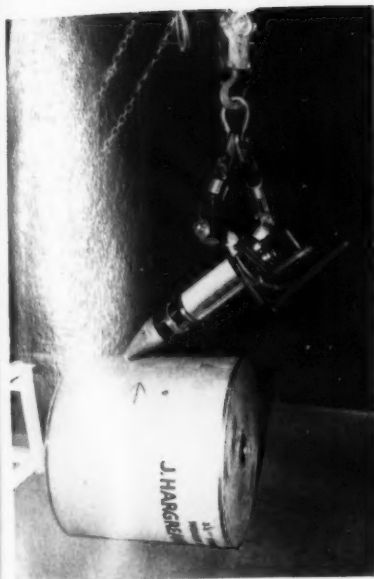
(Extreme left) Quik-Lift mobile hand elevator truck. Powell & Co.

(Left) New hydraulic drum stacker. Lodematic, Ltd.

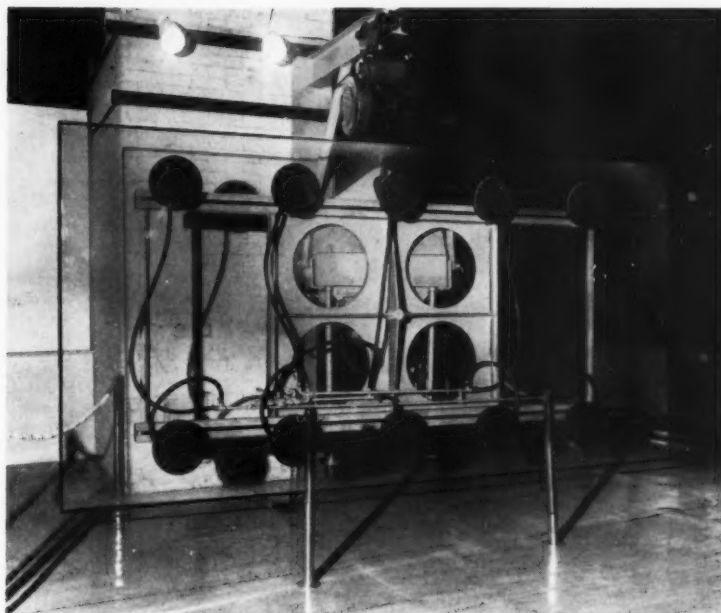
(Below) Lodematic B-type electric high-speed automatic lifter. Lodematic, Ltd.

(Extreme right) The 3800 HS Trolifter Mk II 2-speed stacker with hand-operated Linford hydraulic pump and ram. The Angel Truck Co., Ltd.





(Above) New paper reel lifting device. British Electrical Repairs, Ltd.



(Top right) Vac-U-Lift vacuum equipment handling sheet glass

each case the scissor links of the jacks are formed with compensating cams. They are actuated by rollers attached to the hydraulic jack and the free ends slide on rollers supported on needle roller bearings. A micro-switch to cut off the power in the fully extended position can be adjusted to give any lower height of elevation.

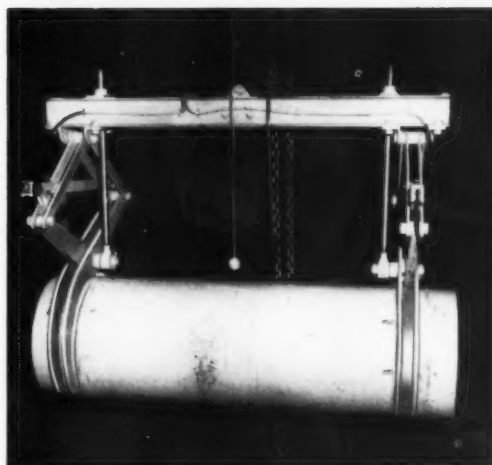
The Bicep 1-ton mobile hydraulic lifting table shown by Access Equipment, Ltd., has a 4-ft 5½-in × 2-ft 0¾-in platform that can raise 4 cwt from 7½ in to 3 ft 3 in in about one minute by means of a manually operated double-acting pump. It is lowered by pressure on a pedal. It has four rubber castors and detachable push-bar or, alternatively, two fixed wheels and tug lift. A static model is also available.

A new safety device shown on a power-operated Bicep hydraulic lifter is a trip bar fitted under each side of the platform. Should it come in contact with the operator's foot or any object, it cuts out operation immediately and prevents possible damage.

Though not exhibited, a new Bicep hydraulic lifter production is of the floor-level type. Said to be the first yet introduced, it requires no excavation but permits pallets or other loads to be wheeled directly on to the platform without lifting.

The application by J. Collis & Sons, Ltd., of their VertiVeyor bucket elevator for the loading and unloading of ships was demonstrated on the company's stand by a model of its installation on the P. & O. liner *Canberra*. This is provided with push-button controls for selecting discharge on to any of the six decks by RotaVeyor roller conveyors which deliver on to deck conveyors that take the loads inside the vessel. For unloading, the process is reversed.

Though particularly suited to handling materials in flat sheet form, the American Vac-U-Lift equipment, for which Vac-U-Lift (Great Britain), Ltd., have acquired manufacturing and selling rights, is adaptable to curved surfaces by the use of vacuum pads of suitable shapes and sizes. Each lifting unit consists of pads fitted with neoprene sealing



(Above) A new pipe-lifting device. British Electrical Repairs, Ltd.

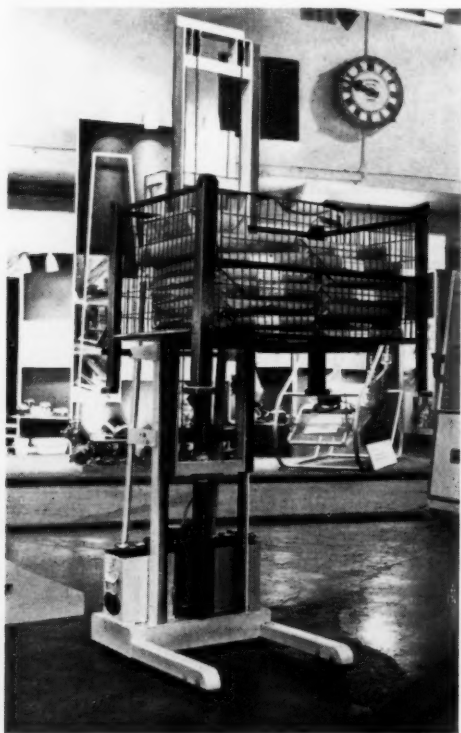
rings and ball and socket-mounted on a steel frame in which is housed an electric motor-driven pump having hose connections to the pads. Push-button control of a 5-way solenoid-operated valve gives vacuum for attachment and compressed air for detachment from the material handled. By means of a reserve tank system the holding power is retained for a minimum of half an hour in the event of a pump or power failure. The example exhibited handling a large sheet of glass is of 600 lb capacity, but units for lifting up to 12 tons can be supplied. Various forms of mounting can be used to accommodate in suitable positions the number of pads required for handling loads of different shapes and sizes.

Simplified and quick handling of two types of load is afforded by new Berl lifting devices, introduced by British Electrical Repairs, Ltd. One, for lifting paper reels, has merely to be suspended above a reel and lowered so that four steel cams with flat outer surfaces enter into the central



Models A and B 'Move-on' self-propelled staging. Anderston Clyde Engineers, Ltd.

(Below) The Sherpa Model 10 stacker. Salisbury Precision Engineering, Ltd.



bore. Two horizontal arms linked to the lifting hook are drawn together as the hook is raised and partially rotate the cams so that they obtain a firm lifting grip inside the bore. When the reel is lowered the grip is released and the device can be withdrawn.

For handling large-diameter pipes a pair of lazy tongs, with curved jaws, are carried at the ends of a lifting beam. When the jaws are lowered over a pipe and the beam is raised, the pipe is gripped firmly and can be lifted as required. Each of the tongs has a cross-connecting bar that operates a cam device which retains the jaws in the open position when the load is lowered and released, but allows them to close when applied to the next load to be lifted.

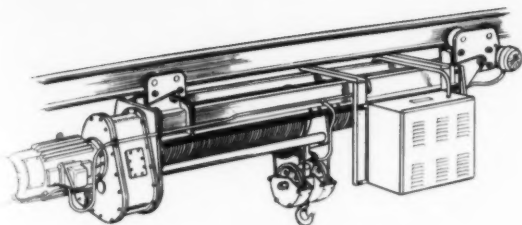
For the continuous feeding of small ferrous components, bottle crown caps and similar articles the Rapid Magnetic,

(Below) A passenger lift was installed by A.C.E. Machinery, Ltd. for direct connection between the ground-floor information centre and the organizers' offices in the gallery.



(Below) The Wall Spider working platform. Access Equipment, Ltd.





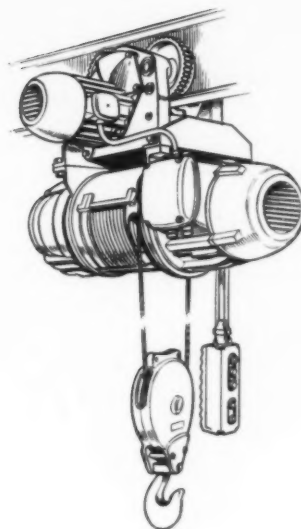
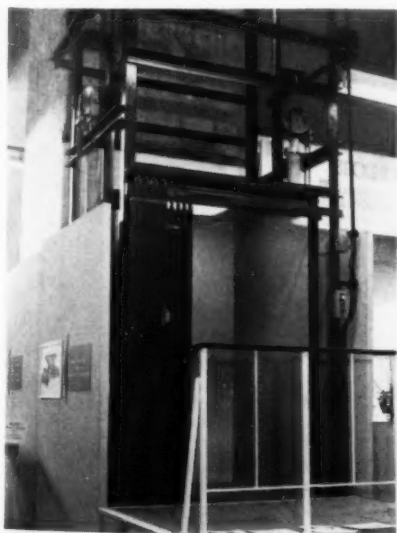
Sketch of the high-lifting electric hoist for the Kelvin power in South Africa. Felco Hoists, Ltd.

Ltd. demonstrated their new electrically driven belt elevator. A rubber and canvas belt runs over pulleys at the top and bottom of a steel frame slightly inclined from the vertical and of a height to suit requirements. It is chain-driven from the motor mounted in the base. Behind the front of the belt a series of magnets, fixed in the frame at close intervals, retain the articles handled on the belt surface until they are delivered over the top pulley, just below which are side plates that prevent them from falling off and also side movement of the belt.

As an example of its many applications for the operation of valves and mechanisms where push-button or automatic control is required, the new Tully actuator produced by the Tully Engineering Co., Ltd., was shown by the West's Group of Industries, as applied to a West lip-bucket elevator to actuate the cam that tips the buckets. A section of an elevator was exhibited and placed horizontally to demonstrate the tipping operation after each bucket has been carried over the top of the elevator. The actuator, a Mark V model for linear movement, is operated by an electric motor with remote push-button control, and drives a square-threaded shaft that passes through an assembly of yokes and limit switches to move a thruster ram that operates the bucket-tipping cam. Manual operation by a detachable handle is also provided. When the handle is inserted, it moves a micro-switch that puts electric operation out of action.

A recent modification of the bucket elevator chain reduces wear in the links by eliminating unnecessary movement on the

Floor-to-floor self-contained elevator. Becker Equipment & Lifts, Ltd.



Sketch of the Demag Hoist type 'P'. Acrow (Engineers), Ltd.

joint pins. Each outer link is prevented from turning on the pin by a locking plate and the two inner links fit on the squared outer ends of the runner wheel bush.

Recently introduced by the Yale & Towne Manufacturing Co., the single-phase Wizard electric hoist can be operated on 200-250 V current wherever there is a 15-amp socket suitably placed. Made in models for $\frac{1}{4}$ -ton, $\frac{1}{2}$ -ton and 1-ton loads, it has a motor brake mechanically interlocked with a manual-type controller mounted where repairs or replacements can be effected without disturbing the hoist. A self-acting Weston screw and disc-type brake operates in oil. The standard lift of all models is 10 ft, and upper and lower limit stops operating directly on the controller shafts prevent over-travel by returning the controller to neutral and applying the motor brake automatically whether the hoist is lifting or lowering. The hook is of special steel, and, if overloaded, opens slowly without fracturing long before any other part of the hoist is strained. Lifting speeds range from $7\frac{1}{2}$ ft/min for the 1-ton model to 25 ft/min for a special quick-speed $\frac{1}{4}$ -ton hoist.

An electro-magnetic disc brake, automatic chain guards, unified threads for international standardization, and a Snip Snap push-button control switch are features of the improved range of MyTeMin Mark II electric chain blocks shown by Geo. W. King, Ltd. As compared with earlier models, they require less headroom, and overall weight and size are reduced for greater mobility. There are four models with load capacities of $\frac{1}{4}$ ton, $\frac{1}{2}$ ton, 1 ton and $1\frac{1}{2}$ tons and hoisting speeds ranging from 30 ft/min to 10 ft/min. If required, the standard hoisting speeds can be increased by 50 per cent, and if fine control is essential, a specially-wound 2-speed motor and gearbox are available, giving creep speeds ranging from 5 ft/min for the $\frac{1}{4}$ -ton model to 1.6 ft/min for the $1\frac{1}{2}$ -ton hoist. Other improved features are a detachable load sprocket which can be replaced in two hours without the use of special tools, limit mechanism governing maximum top and bottom hook positions, a totally enclosed grease-filled gearbox and the housing of all electrical equipment in sealed enclosures.

A choice of 13 lifting capacities varying from $\frac{3}{4}$ ton to 10 tons is provided by the nine models of the new Demag Type P electric hoist produced by Acrow (Engineers), Ltd. It has three main assemblies enclosed in separate compart-



To the left of this display of Yale electric hoists is the new single-phase Wizard 1-ton model. The Yale & Towne Manufacturing Co.



The new MyTeMin Mk. 2 chain pulley block. Geo. W. King, Ltd.

ments of the main housing. At one end is a combination of electric motor and disc brake on the sliding rotor principle. When current is switched off, a rotor return spring pushes the brake disc against the brake-end cap; when the motor is switched on, axial thrust of the conical rotor releases the brake. The brake disc is conical and formed with vanes so that it acts as a cooling fan for the motor. The limit switch and terminal board are housed in the motor casing, which is flanged to that enclosing the rope drum and supporting the helical reduction gear and its oil-tight casing at the other end. The reduction gear driving shaft passes through the drum and is coupled to the motor shaft by a coupling which is elastic in both axial and radial directions to absorb shock loads and permit free axial movement of the rotor, ensuring full braking torque. Each P-type hoist can be equipped with a creeping speed unit by attaching an intermediate reduction gear and extra motor. On some of the smaller models creeping speed is obtained alternatively by a pole-changing motor. A wide variety of models for different forms of installation is available. For stationary hoists a foot-mounted version gives eight different rope lead-off positions, and there are both standard and low headroom monorail travelling types for push, hand chain or electric travel.

A special high-lifting electric hoist displayed by Felco Hoists, Ltd., has been built for the Kelvin power station, South Africa, for handling fan motors. Of 6 tons capacity, it has a lifting height of 143 ft with 620 ft of cable wound on a double-scrolled drum kept within reasonable dimensions by using a 4-fall block combined with an equalizing pulley swivel-mounted at mid span. With a 12-h.p. motor, it has a hoisting speed of 20 ft/min. Up and down limiting stops are in the form of hunting tooth limit switches with drive taken off from rope drum. There is also a mechanically operated ultimate limit stop to ensure that the electric supply is cut off if the hook block rises above its normal drawn-up position.

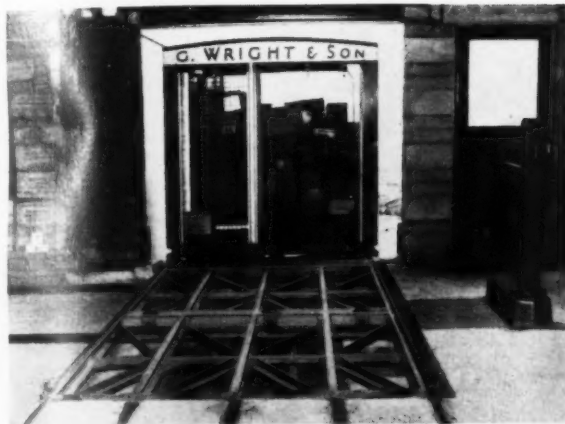
A gearbox at one end of the hoist unit frame houses a 3-stage spur gear reduction running in oil. The hoisting motor is flange-mounted on the gearbox, and slip rings ensure a smooth start in either direction. The load is arrested and held by a 9-in electro-magnetic disc brake. The unit is underslung from two 4-wheeled trolleys, one of which is powered for travelling by a 1-h.p. motor driving all four wheels. Electric controls are in two steel cases slung pannier-fashion over the frame. From one of these hangs the push-button box enabling operators to control the hoist from 25 ft below.

New long span 3-track underslung crane. British Monorail, Ltd.

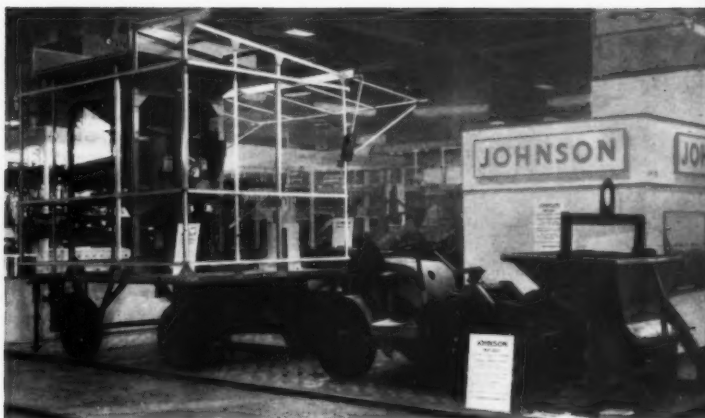




BULK HANDLING



The Cargon system of bulk freighting was demonstrated. This photograph indicates a traverser standing on a 10-ton Avery weigh-bridge. The container in the background has been weighed and is standing on its wheels. Cargon Transport (Great Britain), Ltd.



The Johnson 'Trip-skip' (right) for automatic multi-skip handling. C. H. Johnson (Machinery), Ltd.

(Below left) The Short 'Shorland' straddle carrier demonstrating its application to container handling. Conveyancer Fork Trucks, Ltd.



THE EXHIBITS by Babcock and Wilcox, Ltd., gave a good idea of the very wide range of bulk handling equipment manufactured by that firm. They make complete plants for the bulk handling of coal, coke, ash and dust in power stations and industrial establishments throughout the world; their wide experience has enabled them to provide plants for handling ore, chrome-sinter, mill-scale, sand, gravel, phosphates and chemical products.

Their twin-screw paddle-type mixer conveyors have been developed over a period of some 30 years; typical materials for which these are used include fly-ash and other precipitator dusts, calcium, wood pulp, red oxide, sand and coal slurry. At present some 500 of these machines are operating all over the world, mixing various granulated or powdered material with a liquid, in order to deliver either a product with a controlled degree of wetting, thereby easing the handling of dusty materials; or to meet process requirements where a controlled liquid/solid mixture is necessary.

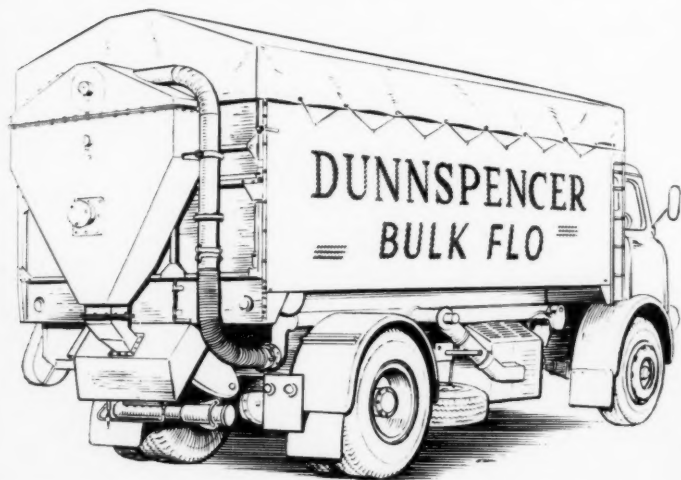
In this type of mixer the dry powdered material is fed into the machine by a controlled rotary feeder and on entering the mixing chamber is conveyed towards the outlet by a series of inclined steel paddles arranged helically on each of two parallel rotating shafts, the paddles of one shaft interleaving with those of the other. The resultant churning action presents the maximum material surface to the liquid, which is sprayed into it from a group of specially designed nozzles, as the material is conveyed through the mixer to the outlet.



Footpedal-operated coal-bagging hopper of 10 tons capacity. C.P.C. (Southampton), Ltd.

The control of the liquid sprayed on to the powder is generally of extreme importance, as the quantity of liquid to wet down the powder may be very critical such as between plus or minus only a mere 2 per cent, when it is required to deliver a product that is just sufficiently damped to avoid dust nuisance in subsequent handling. The standard mixers are available in three sizes, namely Midget, Medium and Giant, their respective capacities being 255, 1,200 and 3,750 cu. ft/hr; but by variation of the speed of the rotary feeder and control of the liquid, a range varying up to 35 per cent either way can be obtained on the Midget mixer and up to 25 per cent either way on the Medium and Giant units.

Artist's drawing of the Dunn Spencer bulk grain vehicle. Spencer (Melksham), Ltd.



The exhibit of International Combustion, Ltd., Derby, showed a wide variety of bulk-handling equipment. Pollock samplers have been developed by this firm for use with belt conveyors and may be applied to both new and existing belts, or complete sampling plants can be installed to work with Pollock samplers. This firm also makes gravity bucket conveyors with capacities up to 300 tons/hr for handling bulk materials in limited spaces. Installations are easily adapted to architectural limitations which may preclude the use of belt conveyors.

The Beaumont skip hoist is claimed to be an ideal solution to the problem of handling and elevating bulk abrasive materials. This machine can be arranged for fully automatic, semi-automatic or manual operation and is available in many standard sizes. Beaumont drag scrapers are installed where large quantities of materials have to be moved from time to time into or out of large storage areas. This system can be operated by one man from a weatherproof and dust-proof cabin, and it may be used either out of doors or inside store buildings.

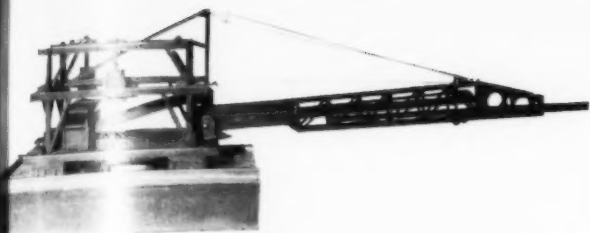
The Vibro conveyor has been specially developed for handling hot and abrasive materials like cement clinker. The conveyors are mechanically vibrated and are available in lengths to meet specific installation requirements; these conveyors can also be constructed for dust-free operation.

Additional extensive coal-handling equipment has been installed by this firm to link up with and augment the handling and storage facilities for the B, C, D and E power stations at North Wilford, Nottingham. This equipment includes wagon tipplers, 38 belt conveyors with a total of nearly 1½ miles and four fully automatic Beaumont skip hoists. Two of these hoists are vertical, with buckets of 200 cu. ft. capacity, and two are inclined, with buckets of 265 cu. ft.

A new mobile pneumatic handling plant has been developed by Spencer (Melksham), Ltd., and was fully described in *Mechanical Handling*, Dec. 1959. It is for handling 50 tons/hr of wheat when the intake nozzle is sinking vertically and the material flowing freely. This rate must be obtained when the intake pipe is 100 ft long laid horizontally with not more than one bend. A Roots-type air exhauster with twin impellers is fitted and vee ropes are used for the drive because of their greater flexibility compared with geared drive; this allows for minor deflections in

The 'Dempster-Dumpster' system of handling materials in bulk was demonstrated. This example is a 25-cu. yd. nominal capacity Dumpmaster self-loading from a 4-cu. yd. castored container. Powell Duffryn Engineering Co., Ltd.





A simple model of an ingenious new bulk-cargo handling system for ships, claimed to have an unloading capacity of 1,500 tons of iron ore per hour, shown by W. G. Bartenfeld & Co., Ohio, U.S.A.

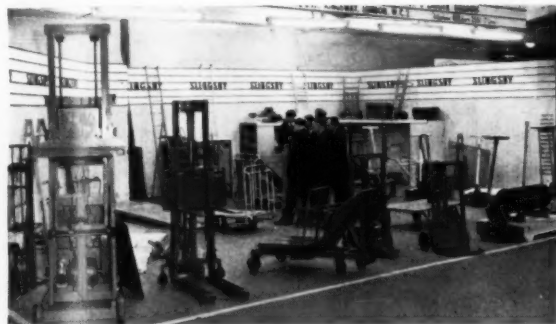
the main chassis frame which may occur when the plant is standing on very uneven ground.

This plant can be operated, when normally discharging a barge, by one man on the plant and one on the barge; it may be necessary to employ an additional man for cleaning up. The fuel consumption is about 8 gal/hr at full load.

This firm claims to have pioneered conveyor idlers for handling all types of bulk materials. A wide range of idlers is available with a grease-packed assembly, including general purpose, heavy-duty, roll-troughing, picking belt and feed-on idlers and various types of return rolls. The introduction of highly flexible Terylene belts has facilitated the development of a new range of deep trough idlers which mark a great step forward in conveyor design.



HAND TRUCKS AND TRAILERS



Slingsby hand trucks, stackers, platforms and other equipment. H. C. Slingsby, Ltd.



Hand trucks and trolleys shown by The Angel Truck Co., Ltd.

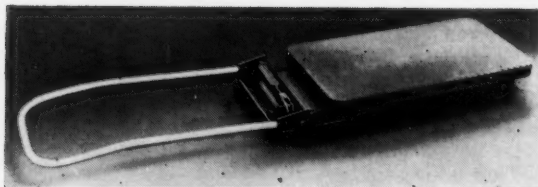
THE types, sizes and uses of equipment under this classification were legion. At the last Mechanical Handling Exhibition it seemed improbable that any more new types of handtrucks could be devised, but several new and promising products of this nature were introduced in 1960.

Eccles (Birmingham), Ltd., were very proud of their Flattie, and justly so. This is their latest medium-duty platform lifting truck which is only 6 in high overall. It can be folded completely flat and was designed primarily to cut down time in loading and unloading stillages in covered or fixed-sided transport. Where a lorry containing (say) eight stillages in two rows of four has to be off-loaded, the first stillage at the tail-board end is first removed by conventional fork lift truck or stacker. Then the Flattie comes into use. It is pushed under the next stillage which the fork lift truck cannot reach, the platform is raised and the stillage drawn to the cleared space on the lorry floor. The Flattie is pushed forward again under the next stillage in line to allow that at the tailboard end to be off-loaded con-

ventionally. This procedure is repeated until all stillages are off-loaded. Loading is just as simple and quick. The makers claim that the Flattie can save as much as 90 per cent of normal loading and unloading time of stillages.

During journeys this useful truck takes up no usable space in transport as it lies out of the way beneath the stillages. It is robustly made and weighs 150 lb. The pump can be operated by hand from road level or by foot from lorry level. The platform size is 18 in × 36 in (suitable for 54-in stillages) and the maximum load capacity is 20 cwt. The Flattie, of course, can be used as an ordinary hand-truck.

The increasing use of Calor and other bottled gases in industry has encouraged several manufacturers to market gas-cylinder trolleys. The Eze-Lift for 32-lb capacity gas cylinders was shown at the Exhibition by the Glenaldie Engineering Co., Ltd. It is of a simple and robust design in which the cylinder is lifted on the trolley by a short cranked hand-lever.



The 'Flattie' lorry-loading truck. Eccles (Birmingham), Ltd.

Powell & Co. had on show their '4 in 1' Handy Truck, another simple and ingenious implement (and a most reasonably priced one) which handles either bins with side handles, milk churns, carboys and sacks simply by adjusting a hook and jaws and two pivoted supports. The '4 in 1' would be most useful in small workshops. The same concern were exhibiting their new Safe-Way combined carboy lifter, transporter and tilter. The carboy is placed in a cradle at ground level and by means of an easy arm and foot movement is lifted to the transporting position. Tilting is controlled to precise limits by a lever.

Another new and simple piece of handling equipment seen was the 1½-cwt capacity folding sack truck by F. Piper & Sons, Ltd. This weighs only 12 lb and as it folds so compactly it can be stowed away in a lorry cab.

G. Hunter (London), Ltd., introduced a hand pallet truck with a stores ladder attached. The ladder, with a 2-ft square platform, is placed astride the front castor and in no way affects the operation of the truck. Of West German origin,

this truck should prove useful in warehouses where stacking is done by hand. The operator has only to stop and mount the steps without further ado. The time and effort expended in moving separate steps or ladders is obviated.

The exhibit of Wessex Industries (Poole), Ltd., combined a number of conventional handtrucks and trailers, but an original note was struck with the Swarf Truck. This is simply a wheel-barrow body of 5 cu. ft. capacity (a single steel pressing) on which are mounted two 8 × 2 solid rubber-shod steel wheels, a handle and a foot. The balance is such that the truck can be tilted to allow the body to be used as a shovel for 'dozing' up light refuse or as a 'dustpan' in which heavier refuse such as swarf can be swept.

H. C. Slingsby, Ltd., had on view a prototype of a bogie for carrying sheet metal, hardboard, plywood, sheet plastics, etc. It is a model of simplicity, consisting of a steel chassis and axle with two small steel wheels. On one side of the chassis a vertical triangular frame is fixed; on the other side is a similarly shaped frame hinged at the bottom and which lays flat for loading. On this frame the sheet is laid. The frame is then raised with the sheet to the vertical position against the fixed frame and held in position by a strut working on a ratchet. To make the sheet and bogie an integral unit for movement, the tightening of a hand-screw clamps the load securely between the two triangular frames.

On the stand of Rolatruck, Ltd. hand pallet trucks made by Ab Bygg-och-Transportekonomic were demonstrated. Although these follow conventional designs they are, perhaps, unusual in construction as all major components of the chassis are fabricated from steel sheet. This relatively inexpensive type of construction enables a robust imported truck to be offered in Great Britain at a very competitive price.

A wide selection of hand trucks and trolleys seen on the stand of Willmott Trucks, Ltd., and Tuglift, Ltd.



Calor gas cylinder trolley. Glenaldie Engineering Co., Ltd.

A new swarf truck by Wessex Industries (Poole), Ltd.



Harefield hand trucks among the exhibits on the stand of Superbuilt Products, Ltd.





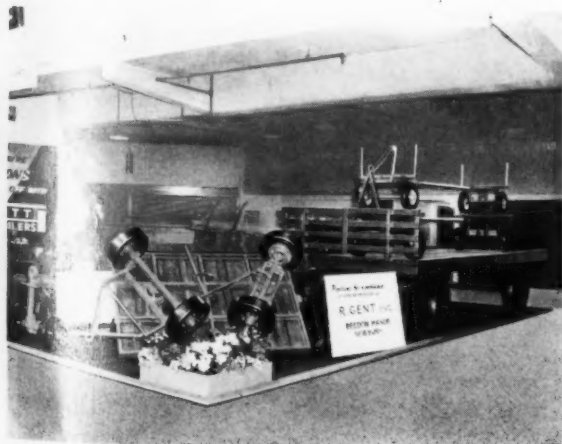
A general view of equipment shown by W. C. Youngman, Ltd., which includes a number of trucks and trailers. The new 5 ton capacity tractor can be seen on the left.

Superbuilt Products, Ltd., showed a new Superlite trolley which will prove useful in many industries. It is fitted with a reinforced fibre-glass tank which has all-rounded corners and is completely smooth inside. The tank, which is easily detachable for cleaning, is manufactured in three thicknesses for light, heavy and medium duties and in three sizes.

Another trolley with a ladder attached was introduced on the stand of the Lenson Engineering Co. The trolley part of this versatile unit has sheet steel top 36 in. x 22 in., with a large tray beneath. The ladder is so sprung that when the user steps on it the trolley becomes completely immobile.

A development of importance to the trailer user was introduced by W. C. Youngman, Ltd.—their 'Autolink'. This has been designed to eliminate all hand operations when trailers are being coupled to prime movers. The Autolink can be fitted to any make of tractor and trailer and basically consists of a flared housing, fitted to the rear of the tractor, in which are two spring-loaded pawls. To couple-up, the tractor is gently backed towards the trailer, the mouth of the housing, which is 18 in. x 9 in. x 12 in. deep, guiding the trailer draw-bar eye into the coupling and thrusting the pawls apart which then snap together and lock the draw-bar into position. The driver can instantly release the trailer by pulling a lever in his cab, and he should thus never need to leave the cab for any part of the coupling operation. Youngman's claim that the extra operative sometimes employed to 'inch' the tow-bar into position can be dispensed with when the Autolink is employed appears to be substantiated.

A comprehensive range of trailers shown by Charles Pitt (Barton Stacey), Ltd.



A hand pallet truck with spring-loaded ladder attached. G. Hunter (London), Ltd.



Hand pallet trucks and feed tables among equipment shown by Rack Engineering, Ltd.

(Below) Diac floor trucks, stackers, lifting tables and pallets. Diac, Ltd.





PALLETS, STILLAGES AND CONTAINERS

MORE THAN 40 exhibitors were showing pallets and stillages. No revolutionary development in this field can be reported, but users unable to attend the Exhibition will be glad to learn that competition in price and delivery dates was keener than ever, and that finish and the quality of the timber used showed a marked improvement. Pallets made from home-grown hardwoods appear to be losing popularity; home-grown softwoods are being increasingly used.

One new timber pallet inspected is worthy of special note. Marketed by Omic, Ltd., and made to a Swedish design, this interesting pallet is of the 4-way entry non-reversible pillar type. The top is of tough 12-mm laminated wood with rounded corners; the pillars are cylindrical and clad with hardened steel sheet. This reinforcement minimizes damage should the forks of a truck not make a clean entry, as any blow on the pillars would, more often than not, be a glancing one.

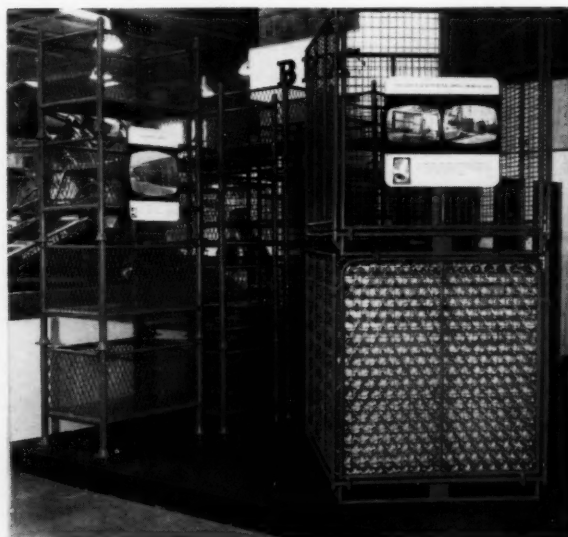
Another promising new 4-way entry design pallet was shown by Lawton (Successors), Ltd. This is of composite construction, all vulnerable edges being protected by steel angle welded to make a rigid overall frame. Although this pallet costs approximately twice as much as that of an equivalent sized timber pallet, its life is claimed to be five times greater, and, in addition, there would be a saving in repair time.

The collapsible steel box pallet is now widely used in the engineering industry and the demand has stimulated several

new designs. One that was well received was introduced by Metal Products (Arden), Ltd., a young concern making their debut at the Mechanical Handling Exhibition. This, the Arden, is a sound engineering job, for with both gates detached, it is still completely rigid. This box pallet folds flat to only 10 in height and it is stackable to five high with perfect safety. Metal Products (Arden), Ltd., also showed a crane pallet for handling metal bar.

Another new collapsible steel box stillage carried the claim that it is the only one of its type that can be handled by cranes as well as by fork lift trucks. P. C. and C. K. Chase, Ltd., showed a small prototype of this equipment which would appear to have promising possibilities in both road and rail transport systems. The dual handling function is achieved by the removable gates taking most of the tensile strains when the stillage is slung.

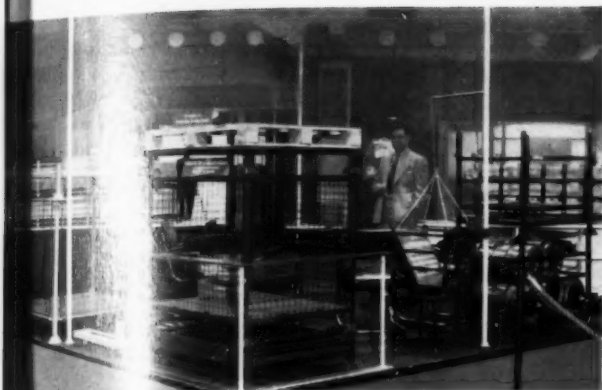
The Penfold Fencing & Engineering Co., Ltd., who, like many other pallet exhibitors, specialize in designs to meet customer's particular problems, gave prominence on their stand to a new pallet bogie. This can be adapted to carry most types of pallet and has been developed for use in confined spaces where a fork truck or normal pallet transporter could not operate. Mounted on smooth running castors, the bogie is easily manœuvrable to the most inaccessible loading position. When the pallet it carries is filled it can be wheeled away for storage or removal by fork truck. The pallet shown with the bogie was designed for heavy duty and could be used either as a box pallet for castings, etc., or for



Stacking cages and crates. Tubewrights, Ltd.

A comprehensive range of pallets and stillages including a new range of stackable workpans. M.G.K. Engineering Co., Ltd.





carrying and storage of steel bar. The bogie is 48½ in × 30 in in size and has a load capacity of 1,300 lb.

E. Stephens & Sons, Ltd., were offering a new range of interesting steel stillages. The 1-ton model (48 in × 40 in) will nest three to each foot of height; the ½-ton model (36 in × 27 in) nests eight to every foot of height. Stephens were also showing a recently introduced pallet for carboys. This consists of a steel open-sided box pallet with a central pillar at the top of which are four hooks. On each of these hooks a carboy is hung by means of its steel cage. This pallet, which is stackable, will stand considerable tilting without danger of the carboys slipping off the hooks.

The Pallet Converters introduced by W. C. Youngman, Ltd., attracted many visitors. These provide a means for converting ordinary timber pallets into box or post pallets for the movement and storage of awkward crushable loads. The converters are in two sections of welded steel tube and are fixed together by two steel pins. Assembly and dismantling is speedy and simple and when not in use the converter sets can be easily nested to take up the minimum floor space.

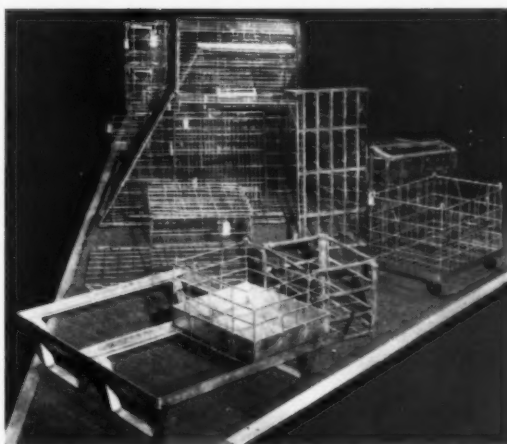
A post pallet for sheet glass, designed specially for Pilkington Brothers, Ltd., was among the exhibits on the stand of Tubewrights, Ltd. These tubular steel pallets have a load capacity of one ton. The glass stands on rubber cushions and is held in place by webbing straps. This new approach to the handling of a very fragile material aroused much interest.

Diac, Ltd., had a large pallet and stillage exhibit which included a stack of 'easy access' box pallets, a type which is gaining favour. In design these follow the familiar type of fixed box pallet fabricated from steel angle or tube with wire mesh or sheet steel sides except that two opposite sides slope outwards at about 30 deg from the bottom, providing at the top of the pallet two sizeable entries. On these two sides the contents can be removed from any pallet in a stack without, of course, unstacking.

The Parker Timber Co., Ltd., also on the Diac stand, laid emphasis on the advantages of their 'Screw-Tite' fastenings. This type of drive-screw with a cement-coated double helical thread, in size 2½ in dia, is claimed to have a holding power of 665 lb when driven in oak for two-thirds of its length and 346 lb when driven in soft wood.

Lee Cases, Ltd., were offering a box attachment made of steel angle and laminated wood slats for converting flat timber pallets or stillages into the box variety. The display of timber pallets by Tilgate Sawmills, Ltd., was noteworthy for the very large range of standard designs, no fewer than 22 being offered for almost immediate delivery.

A new light-duty stillage was introduced by W. Groom, Ltd. Of the variable-depth box type, the base consists of a

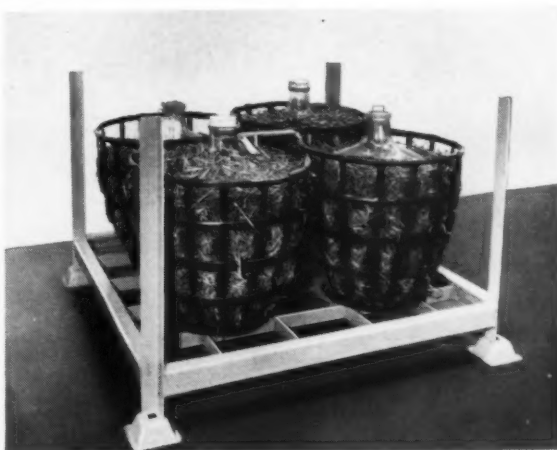


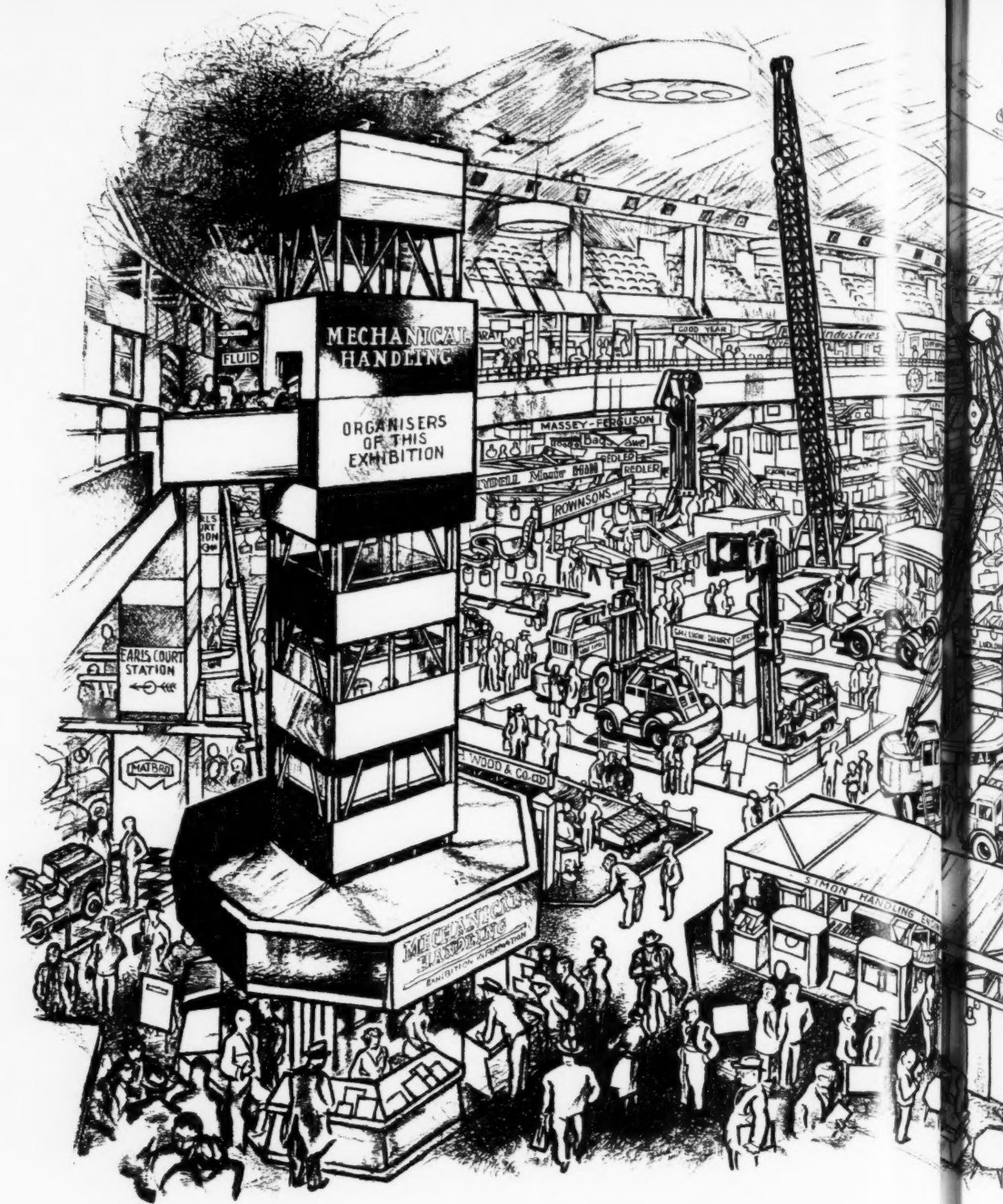
(Top left) A model of a new freight container, fully collapsible and capable of being slung, was among the exhibits shown by P. C. & C. K. Chase, Ltd.

(Top right) Light alloy containers and trolleys shown by Light Alloy Construction, Ltd.

(Above) Containers and carrying equipment shown by British Metal Crates, Ltd.

Metal pallet for carboys. E. Stephens & Son, Ltd.



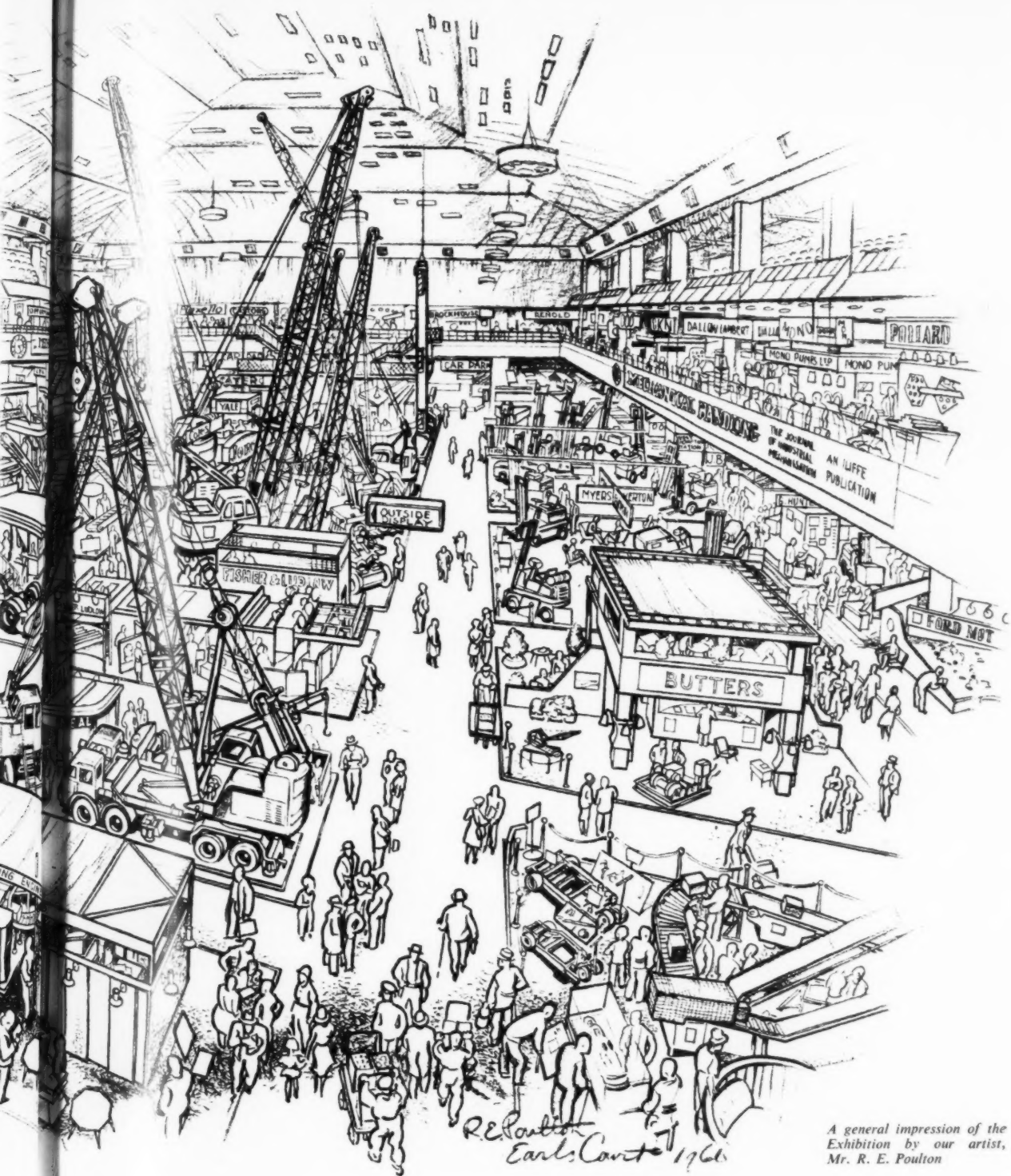


conventional wooden stillage on which is placed a series of inter-locking surrounds or bottomless trays, thus enabling the box to be built up to whatever depth is necessary for the particular product being handled.

The variety of containers on display was wide, and in many of the new products use was made of the latest materials. White, Child & Beney, Ltd., introduced a range

of compression-moulded resin chip-board stacking boxes and trays. They are light, strong and durable and are suitable for wet or dry products. This new line is likely to become popular as it is surprisingly reasonably priced.

Showing for the first time at the Mechanical Handling Exhibition was the Collico packing-case hire service. This is operated in conjunction with British Railways. The cases

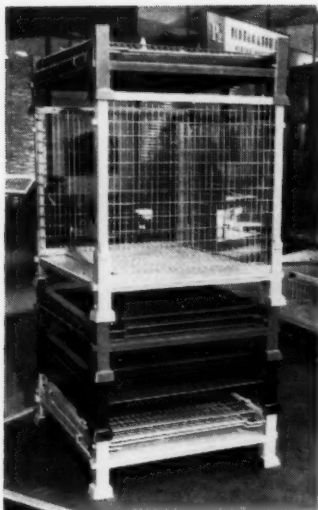


A general impression of the Exhibition by our artist, Mr. R. E. Poulton

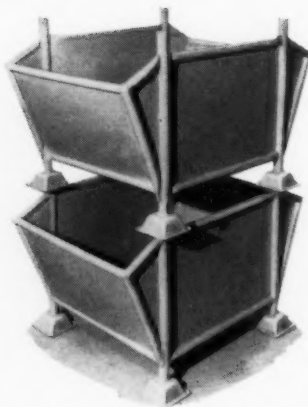
are fixed for a minimum period of one month and are completely collapsible for cheaper return journeys and storage. They are made either from aluminium alloy or steel pressings or are of composite alloy and laminated wood construction. The life of a case is estimated to be three years. The Collico system was demonstrated on the stand of Light Alloy Construction, Ltd., who make the

cases, and many advantages are claimed for it, not the least being that carriage is paid on the net weight of the contents only—the case 'travels free'.

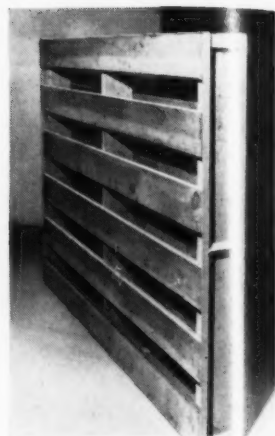
On the same stand Palcon pallet containers were shown. These also are available for hire. They are designed for handling by fork lift or pallet trucks and are made from aluminium alloy. When collapsed they occupy no more



A stack of collapsible pallets shown by Metal Products (Arden), Ltd.



(Centre above) Nest of Easy Access containers. Lawton (Successors), Ltd.

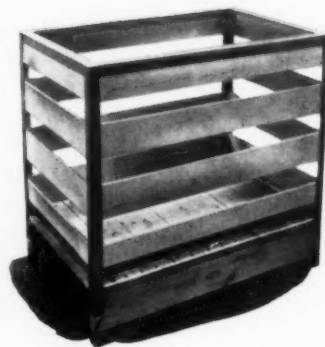


(Top right) Metal-framed wooden pallet. Lawton (Successors), Ltd.

space than a standard pallet. Two types are available: P 554/1 which has internal dimensions of 37 in \times 29 in \times 19½ in, a tare weight of 54 lb and a weight capacity of 1,020 lb; and the P 554/2 which has similar dimensions, but being of lighter construction has a tare weight of 48 lb and a weight capacity of 510 lb.

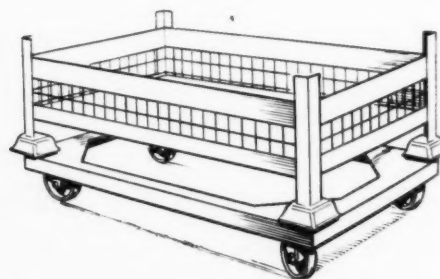
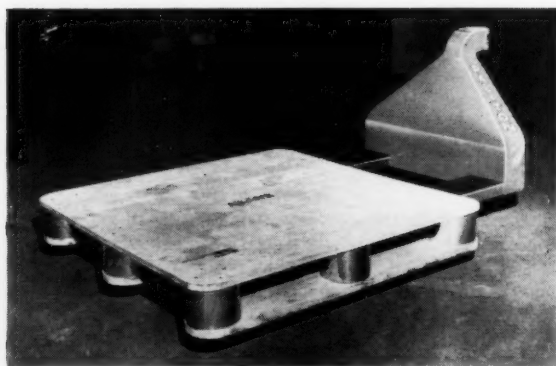
Kimbell Machine Tools, Ltd., demonstrated a number of new adaptations of, and accessories for, the Fix storage system which they market in this country. The system is based on self-stacking containers and shelf units, there being six basic containers ranging from 2.8 cu. ft. capacity to 15 cu. in. capacity. Anything from the smallest turned parts to bulk chemicals can be stored and the containers can be transported by track, crane, trolley or conveyor.

Fix containers are made of strong steel pressings, hot dip galvanized or stove enamelled. In addition, the four smaller sizes are available in plastics—either nylon, high-impact polystyrene or polythene in red, yellow, blue or green. The galvanized containers stand up to a maximum load of 5 tons; thus, they can be stacked, fully loaded, up to roof height with absolute safety. The 'Open-Front' design enables containers to be filled, emptied or stock-checked without having to be moved. Fix stackable shelf units are available in various sizes and there is a wide range of accessories.



Timber pallet with box attachment. Lee Cases, Ltd.

A new pallet of Swedish design. Omic, Ltd.



Sketch of a pallet bogie. Penfold Fencing & Engineering, Ltd.



HYDRAULIC AND PNEUMATIC EQUIPMENT

THE extensive use of hydraulic and pneumatic equipment within industry, with special reference to mechanical handling, was emphasized by the large representation of hydraulic and pneumatic engineering exhibitors at Earls Court. Some 40 manufacturers presented a varied display of control valves, vane pumps, hydraulic hoses and couplings, steering boosters, hydraulic rams, gear pumps servo valves, etc.

'Hydraulics', with their ability to successfully move the heaviest of loads with instant action, the smoothness of that action, the facility to control movement to very accurate limits coupled with a basic simplicity and robustness of design and components, giving long life and simple maintenance, all these characteristics have ensured that materials handling equipment engineers have increasingly made use of hydraulic components in their equipment, with consequent benefits in ease of operation and flexibility in application and overall efficiency.

Some of the newer developments in power-assisted steering were seen on the Stein Atkinson Vickers Hydraulics, Ltd. stand. Here, along with a comprehensive range of British-made Vickers-Detroit hydraulic equipment, including vane motors, control valves and high-performance pumps, was a working demonstration of a power-assisted steering system and an electro-hydraulic servo system. The demonstration effectively showed the marked improvement in control and ease of operation provided by power-assisted steering, compared with the orthodox steering system. A full range of accessories is available, giving a variety of linkage and control methods, enabling the system to be incorporated and perform efficiently under a variety of installation and operating conditions.

The Vickers-Detroit high-performance vane pump with all wearing parts contained in one easily accessible replaceable cartridge, has obvious maintenance advantages—it is claimed that a complete change of the wearing parts can be made in ten minutes, a highly desirable feature where down time can be costly in terms of lost production time. These pumps are designed for 2,000 p.s.i. duty at 2,000 r.p.m. with deliveries to 100 g.p.m. and more.

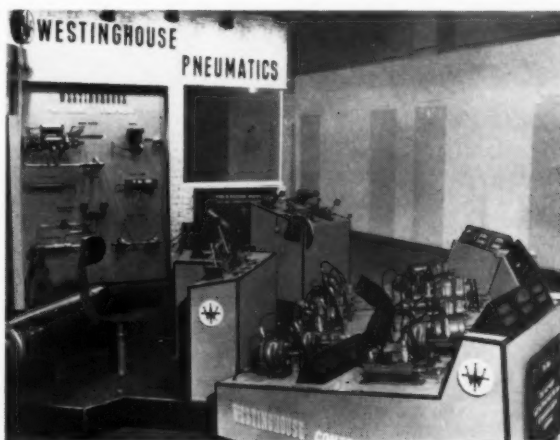
Super Oil Seals & Gaskets, Ltd. showed their new quick-release self-sealing coupling—the Aeroquip Golden Flow. This is a new self-sealing, quick-release hydraulic coupling, low in cost, positive in action, with simple but very robust construction. The coupling is disconnected by a firm manual pull—as the two halves come apart each is immediately sealed. Reconnection is accomplished by simply pushing the two halves together. At no time is there any need to turn on or off the fluid supply and working pressures are up to 3,000 p.s.i. A special holding bracket that enables the coupling to operate as a breakaway unit is also available. This bracket, which allows a 30-deg circular movement of the coupling, holds one half of the unit so that, in the event



Hydraulic and pneumatic equipment on the stand of Martonair, Ltd.

BELOW

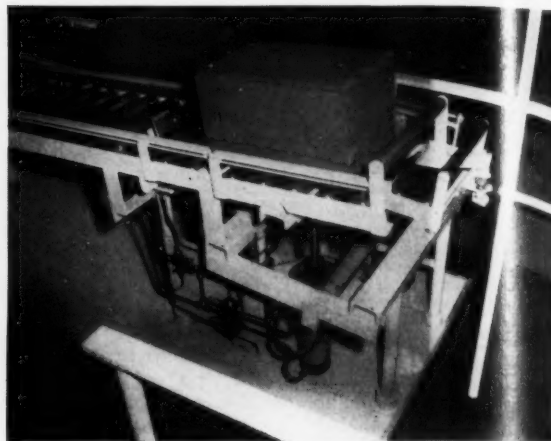
A demonstration showing the layout of controls for a modern excavator among the equipment shown by Westinghouse Brake & Signal Co., Ltd.





(Left) A Coventry Climax 1GET fork lift truck fitted with a Lucas hydraulic unit. Joseph Lucas, Ltd.

(Below) Air control demonstration unit, shown by Maxam Power Ltd.



of any unexpected pull on the feed line, the coupling will break before any damage is caused to the feed line or the connected equipment. This new coupling has obvious advantages in affording a rapid change of feed line between items of equipment with no loss of fluid, without the necessity to turn on or off the main feed. A wide range of oil and grease seals manufactured by this exhibitor were also displayed.

Winget, Ltd., displayed an ingenious application of hydraulic equipment—an hydraulic motor vibrator. The 'Vibro-Verken' patented motor vibrator has an hydraulic motor built into the motor body. It has been extensively used in assisting in the fast thorough emptying of tipper trucks. Mounted below the tipper body, the vibrator can be controlled by the driver from his cab and the discharge speed can be regulated via the accelerator pedal—the pump flow increasing or decreasing with the engine speed. This vibrator has other static applications where the use of electrical vibratory equipment is precluded for safety reasons.

A well-known example of the use of hydraulics was shown at the stand of Access Equipment Ltd. This was a range of their 'Bicep' hydraulic lifters. Powerful, rugged in construction to withstand very heavy loads (up to 10 tons), these lifters give finger-tip control of their movement and very accurate positioning between varying levels of lift. An ingenious safety device has recently been incorporated in these hydraulic lifters. A pressure-sensitive safety trip-bar directly below the platform ensures that any obstruction below the platform will actuate the bar and cut out all movement immediately. Other devices for use with these lifters are a levelling attachment providing automatic levelling of sheet materials for machine feeding applications and an automatic feeding attachment suitable for machine feeding of materials of $\frac{3}{8}$ in thickness and more. Other uses of this hydraulic lifter are in lorry loading and the transfer of heavy goods between varying floor levels.

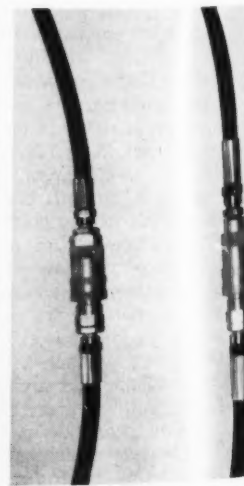
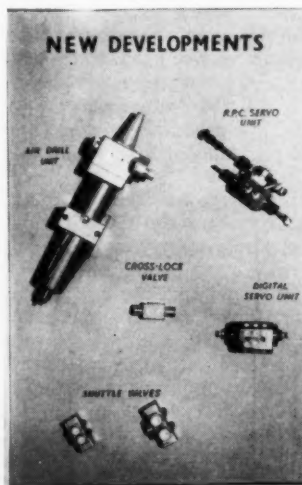
Kelavite Hydraulics, Ltd., specialists in complete hydraulic systems to all industries, exhibited a wide range of their hydraulic equipment. Included were examples of their self-contained hydraulic power units—power packs—with pump capacities to suit customers' requirements, these units are available in four sizes of tank capacity (7½ gall to 75 gall), electric motor (2-25 h.p.) and overall dimensions from 18 in × 12 in × 12 in to 40 in × 24 in × 24 in. Each pack is so designed that valves most suitable to particular applications can be fitted. These valves, e.g. relief valves,

Power pack shown by Keelavite Hydraulics Ltd.



Demonstration board showing new items including the air-drill unit. Baldwin Industrial Controls.

Breakaway hydraulic coupling units. Super Oil Seals & Gaskets Ltd.



flow-control valves, pressure-reducing valves and sequential and directional-control valves are available from this manufacturer.

A motor-mounted power pack has obvious advantages in operating a battery of hydraulic jigs and tools in intermittent use. Another advantage of this compact unit is where a remote control system must be used for safety reasons, e.g. explosive atmospheres—in this case the power pack can be conveniently located at a safe distance from the operating mechanism.

New to this exhibition was this manufacturer's Rotary Torque Actuators (Rotac), a simple device for producing reciprocating rotary power. Compact in design, they can be used for a variety of movements, including pulling, pushing, opening, closing, lifting, lowering, indexing, etc. Providing high power in a compact space, torque actuators can be mounted vertically, horizontally, or at any other convenient angle—with mountings that allow the unit to be stationary with shaft rotation or vice versa, with the body rotating round a stationary shaft. Controlled by hydraulic valves, a fine degree of control of all speeds can be achieved. The arc of travel is normally 280 deg, controlled by valves or alternatively by positive stops. The variety of application is wide, including that of crane boom operation, machine-tool usage, control of movement of materials on conveyors, and the automatic opening and closing of doors, hatches and valves.

The combination of pneumatic and hydraulic power was well illustrated on the stand of Baldwin Industrial Controls. Among many examples of low-pressure air and hydraulic equipment on display was this company's new air drive unit. With particular application to tapping operations, this unit has been designed as a fully-automatic power tool. Working on a compressed-air supply of up to 250 p.s.i., it will accommodate a variety of tool holders for both drilling and tapping operations and can be used individually, in sequence or simultaneously with others actuated by a remote control signal. The pneumatic power moves the tool into position and gives the operational power—hydraulic power is applied to ancillary control features.

A digital servo unit, providing conversion of digital signals into analogue signals, was also displayed and is further evidence of the increasing application of hydraulic/pneumatic power in providing facilities of automatic operations within industry.

Other examples of hydraulic equipment exhibited included a telescopic ram for agricultural purposes, displayed by Weston Works (Birmingham), Ltd., a range of hydraulic jacking and clamping equipment of 10 cwt to 11 tons capacity by Power Jacks, Ltd.

Electro-Hydraulics, Ltd., showed a self-advancing powered support system for coal face roof support, with the supports advancing and withdrawing mechanism all hydraulically operated.

A working demonstration of a hydraulically-powered conveyor unit was exhibited by Richard Sutcliffe, Ltd. Pneumatically-operated conveyor systems were displayed by Martin Power, Ltd., Thomas Robinson & Son, Ltd., and F. F. Callow (Engineers), Ltd.; all these systems demonstrated the ingenuity of the designers, the many ancillary features that are available, the great degree of flexibility in control of directional flow and speeds, and the wide application of hydraulic and pneumatic engineering as a prime source of power.

Dispatch Dispatches, Ltd., and Lamson Engineering Co., Ltd., showed extensive displays of their pneumatic tube systems. These systems, tailor-made to customer requirements, give a variety of automatic control features allowing pre-setting of delivery points on the carriers and can carry quite considerable weights ranging from inter-office memos



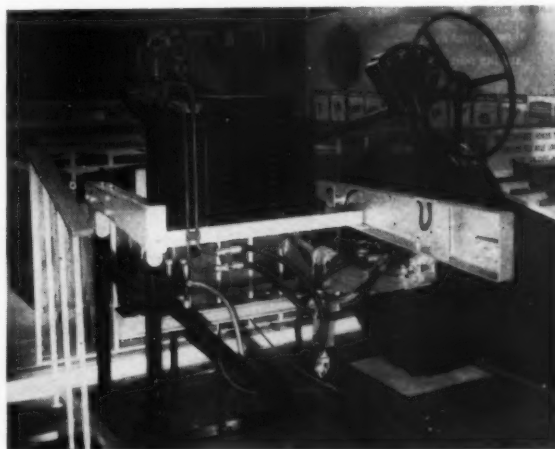
A new hydraulic motor was included among a wide range of equipment shown by the Industrial Hydraulics Division of The Plessey Co., Ltd.

to laboratory specimens, small tools, and document files of varying thicknesses.

The use of vacuum in lifting heavy material was clearly shown on the Vac-U-Lift (Gt. Britain), Ltd. stand, where a variety of equipment for automatic lifting of steel plates, beams, pipes, etc., was exhibited.

Among the many exhibitors of hydraulic and pneumatic components, e.g. single- and multi-way control valves, couplings, feed hoses, cylinders, rams, compressors, gear motors, pumps, spray and blow guns, were Martonair, Ltd.; Joseph Lucas (Hydraulic & Combustion Equipment), Ltd.; Hydraulics & Pneumatics, Ltd.; Hamworthy Engineering, Ltd.; Dowty Hydraulic Units, Ltd.; Spenborough Engineering, Ltd.; The Plessey Co., Ltd.; A. Schrader's Son, Ltd.; and Lang Pneumatic, Ltd.

Power-assisted steering demonstration. Stein Atkinson Vickers Hydraulics, Ltd.





POWERED TRUCKS

MATERIALS handling is a specialized industry, but like all industries to-day, through technological development, there is an increasing tendency for specialization within the industry. This is particularly true of the truck industry.

The larger powered truck manufacturers continue to extend their ranges to meet ever-widening needs and applications and, at the same time, the smaller manufacturer is concentrating on specific fields developed through market experience and location.

For Hospitals

In the latter category are Geest Industries, Ltd. They showed a new pedestrian-controlled platform truck which is practically silent in operation and is therefore particularly suitable for hospitals. It is equipped with pneumatic tyres and two speeds in forward and reverse. The tiller steering is particularly smart in appearance, the tubular members being finished in a stoved hammer blue and the fittings in nickel plate. The truck, which is one of a range, can operate a full eight hours before re-charging the battery at night. This type of truck is suitable for hospitals, stores and warehouses.

Eccles (Birmingham), Ltd., specialists in the smaller truck, have produced a new 'Long Load' stillage truck. The latest model on show incorporated powered traction and elevation. This unique truck, with the entire power unit situated to one side of the lifting frame, can carry a long load of material in a 4-ft gangway. The capacity is 2 tons, with an elevation of 3 in.

The power drive is unusual, being composed of an hydraulic wheel. This unit forms a transmission system in which a single lever controls infinitely variable speeds in either direction and in which braking is automatic. Manoeuvrability is extremely good, with finger-tip control

of inching and creep speeds. All working parts are totally enclosed. The truck design is simplified through the use of this unit because shafts, clutch, gears and electrical controllers are eliminated.

New Fork Trucks

Another manufacturer of small trucks, Powell & Co., have increased their range of trucks with the introduction of a pedestrian-controlled fork lift truck. This is called the 'Vertostacker', Series VK/20, and is a specially-designed compact truck for operation in narrow confines. The control handle, of the 'dead man' type, is designed so that the direction of travel can be pre-selected. There is a fast rate of lift—empty 36-38 ft/min, loaded—22 ft/min. The capacity is 2,000 lb at 20-in load centre, and there is a 4-in free lift on the telescopic masts. The lifting height is 146 in. The truck is fitted with a free-wheel arrangement to facilitate stacking.

Two new electric trucks shown by Montgomerie Reid Engineering Co., Ltd., were a fork lift truck and a platform truck, both rider operated. The former is called the 'Ministack' and is fitted with hydraulic brakes on all wheels. The capacity is 1,680 lb at 20 in with a 108-in lift height. The turning radius is 46 in. The hydraulic foot brake operates on the front wheels. Variable speed control is obtained through a foot pedal-operated multi-step control. Release of the foot pedal automatically applies the electric brake. Forward or reverse direction is pre-selected by an electric interlock.

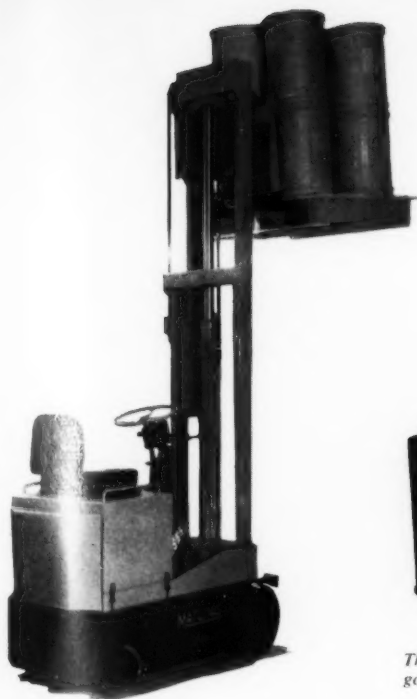
The rider-operated platform-truck is made in two models—10-cwt and 20-cwt capacity. A flat platform body with timber decking is fitted as standard. Special bodies can be fitted to suit individual requirements. The controls, for two speeds forward and reverse, consist of a hand lever conveniently placed on the steering handle. Body size can be 54 x 30 and 60 x 36 inches. The loading height is 15 in.

Lansing Bagnall, Ltd., introduced a 3,300-lb reach truck, named the 'Spacemaker 3300'. The new model, which completes a trio, incorporates the latest engineering techniques, utilizing a 'motor in wheel' drive unit which requires less space than a conventional motor and gearbox and gives improved accessibility. Great thought has been given to the question of improved accessibility generally, so that maintenance can be as simple as possible. The hydraulic units, the electrical control box and the reach jack are all easily accessible in the chassis compartment. The pump and motor and hydraulic oil tank are mounted on the inside of the main chassis door, so that when this is opened they swing out. The electrical control box is mounted on the back of the chassis compartment and hinged, so that it can be pulled out.

The new truck fills a long-felt need, it is claimed. It has been apparent for some time that many users, while needing to handle unit loads of more than one ton in weight, have

A display of power trucks by Floataire, Ltd.





The Matling 'Lion' shown by Matling, Ltd.



The Ministack fork truck (right) and a platform truck shown by Montgomerie Reid Engineering Co., Ltd.

never any necessity to handle 2-ton loads or anything near that figure. For them the 1½-ton reach truck should prove ideal. Like its two companion vehicles, the new model is battery-electric and rider controlled. It can travel at 5 m.p.h. unladen and at 4½ m.p.h. with a full load.

Electric Fork Lift Trucks

Continuing the general policy of the big firms to extend their range of trucks to cover all types of power units, all practicable capacities and other specification data, Coventry Climax Engines, Ltd., showed two new electric fork lift trucks of 5,000 and 6,000-lb capacity at 24-in centres. These are models IGEV and MSE, respectively, and the following is relevant data. Lift height 130 in in both cases, free lift 6 in in both cases, turning radius 77 and 82 in, wheelbase 54 and 58 in, lift speed laden 30 and 35 ft/min, travel speed 5½ and 6 m.p.h. The trucks are fitted with cushion tyres.

Omic, Ltd., displayed their pedestrian controlled 'Paliton' 1-ton capacity truck, which is equipped with electrically-operated adjustable forks. This truck, model EP40, can thus handle cylindrical objects from 10 to 48 in wide. Such objects may be reels, drums, rolls of carpet, cotton, linoleum, etc. The elevation is 5 in.

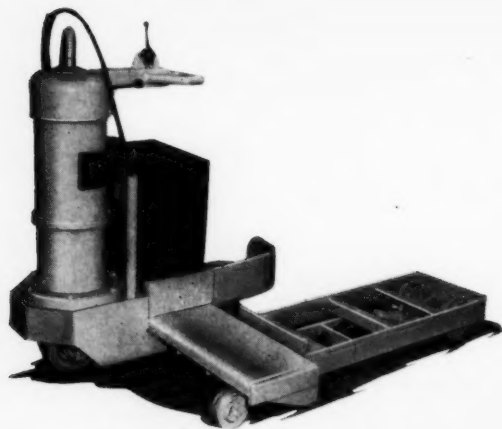
Confirming the theme of consolidation, extension and development, Matbro, Ltd., showed their new heavy fork lift truck, model 40. This truck incorporates several features, extending and improving the two-part application of this firm's products—internal and rough external operation. In fact, everything is 'extra'—extra rugged frame, heavy mast sections and a specially-designed carriage which avoids undue wear on rollers and mast channels. Extra manoeuvrability for confined spaces indoors—narrow width combined with a turning radius of only 78½ in. The truck has larger wheels and even better rough ground perform-

Lancers 800 Sideloader. Lancers Machinery, Ltd.



A selection from the wide range of B.E.V. electric industrial trucks. Wingo & Rogers, Ltd.





A long-load powered lifting truck shown by Eccles (Birmingham), Ltd.



Conveyancer 4-24 Series 3 fork lift. Conveyancer Fork Trucks, Ltd.



8TD platform truck incorporating the 'Geest-Tramatic' drive. Geest Industries, Ltd.



Wrigley E734 electric truck. Wessex Industries (Poole), Ltd.

ance, but, although larger wheels are fitted, by special design of the rear axle and steering gear, the above turning radius figure is smaller than the other machines. The truck has a low seat height (34 in) enabling the driver to pass through doorways without having to duck his head. Accessibility is better as the driver on the '40' does not sit on the engine cover and thus it is easy to get at the engine, steering gear, electrical equipment, etc. Capacity is 4,000 lb at 24 in centres, lift height 16 ft.

Tractors

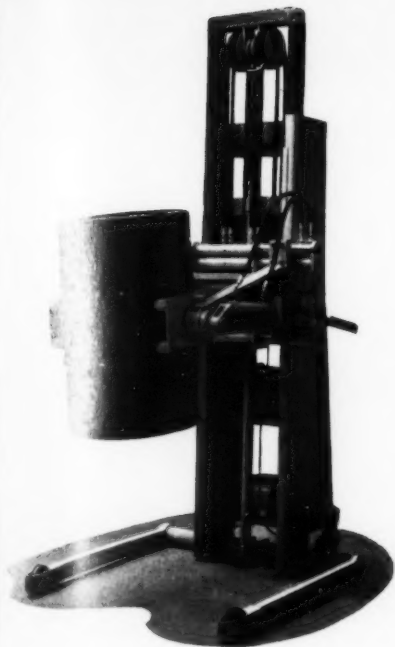
The Mercury Truck & Tractor Co., Ltd., have also extended their range of products and exhibited the new model 40P industrial towing tractor. This model has a drawbar pull of 4,000 lb, a turning radius of 108 in, speed of 12 m.p.h. and is fitted with a three-cylinder Perkins diesel engine. Also new is the Model AT100 towing tractor which has a drawbar pull of 10,000 lb, turning radius of 180 in, speed of 15 m.p.h. and is fitted with a 6-cylinder Ford diesel engine. This heavy-duty machine is equipped with a Brockhouse torque converter and is suited to steel plant and heavy airfield duties.

Fork Truck Sales and Service

A new diesel fork lift truck of 4,000 lb capacity was shown by the Materials Handling Division of The Yale & Towne Manufacturing Co. This marks the beginning of Yale diesel truck production in Britain. The theme of the stand was the Company's world-wide manufacturing, sales and service facilities. A relief map of the world showed the location of the Company's manufacturing division, licensed manufacturers and sales and service agents. A map of the British Isles showed the location of service depots, service engineers and area sales offices.

The stand was designed to represent a large packing case being lifted on the forks of a Yale 10,000 lb Series 5 battery electric fork lift truck. This series is now being manufactured in capacities of 3,000 lb to 10,000 lb at 24-in load centres at the Wednesfield plant—claimed to be the largest complete range of rider electric fork lift trucks.

A feature of the stand was a multiple display of mast



Hydrum CL2 drum clamp. R. H. Corbett & Co., Ltd.



I.T.D. tyre handling attachment

assemblies fitted with some of the Yale range of hydraulic attachments for fork lift trucks. These attachments include a rotating fork attachment, a side shifter and a load stabilizer. Five masts all 83 in overall height give lifts from 65 in to 180 in. Non-telescopic, simplex, duplex and triplex masts were represented, all constructed to the exclusive Yale roller mounted design. Power for operating this display was obtained from a 'parent' battery electric truck of the Series 51 range which highlights the simplicity of the Yale system of multiple function controls.

The new diesel truck, The Yale D51, has a laden lifting

speed of over 50 ft/min and a laden lowering speed of over 70 ft/min. The lifting capacity of 4,000 lb is at 24-in load centres. The truck is fitted with a Perkins Four 203 diesel engine, has a fluid drive two speed either way gear box, giving a travelling speed in each direction of over 8 m.p.h.

Matling, Ltd., demonstrated their new 'Lion' 1-ton battery electric fork lift truck. The machine has been constructed without the normal electrical contactor equipment thus obviating the troubles with this type of gear. The truck is equipped with a contactor, but for only starting and

The Hyster Space Saver 40 truck. Fred Myers, Ltd.



Irion 'Lizard' side-operating reach truck. Materials Handling Equipment (Gt. Britain), Ltd.

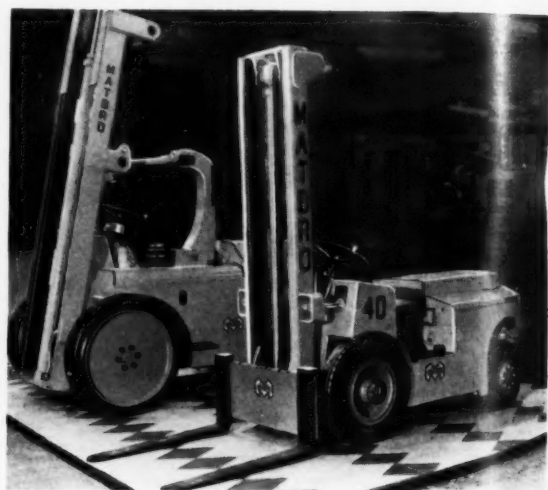


stopping. The firm's engineers have fitted a clutch of their own design between the drive motor and the transmission, thus taking up slip and heat generation. With this type of drive 'creeping' can be accomplished much more smoothly than when a machine is equipped with normal electrical arrangements. Servicing is greatly simplified, which was one of the principal objects of the design. There are three separate motors—one for drive, one for tilt and one for lift—such an arrangement, of course, reduces the drain on the battery. Brief specification is: 1 ton at 24-in centres, turning circle 128 in dia, overall height mast raised 110½ in.

Salisbury Precision Engineering, Ltd., Middlesex, is another company which is continually developing and extending the range and type of trucks marketed. The 'Sherpa' self-propelling straddle-type fork truck, model 12, is of pleasing design. It will lift 15 cwt to 10 ft on 36-in forks at 18-in load centres. The heavy gauge steel body sections are electrically welded throughout. The joy-stick-type lift and lower electro-hydraulic control is readily accessible from all working angles. It is equipped with 6-in cast iron rollers on the arms, arranged in tandem to override floor irregularities.

Fred Myers, Ltd., displayed the well-known American Hyster trucks. One model was on show which was produced in the organization's new factory in Scotland. Production there is now going ahead. There were two examples of one model on show from this factory equipped with different attachments. This model 40 (4,000 lb at 24-in load centres) is produced with a diesel engine.

British produced Hyster fork trucks will soon be fitted with the 'Monotrol' control system already fitted to American models. The system, it is claimed, eliminates unnecessary and unnatural driver motions—provides easier, faster close-quarter manœuvring. Forward/reverse and speed are right-foot controlled by the 'Monotrol' pedal. Driver's hands are free for full-time steering and load



TOP

Universal Major model MSE fork truck. Coventry Climax Engines, Ltd.

RIGHT

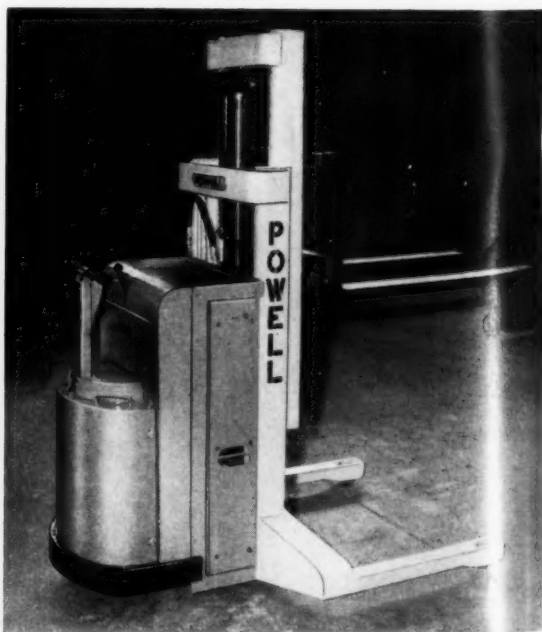
Matbro model 40 truck in foreground with a larger model to the left. Matbro, Ltd.

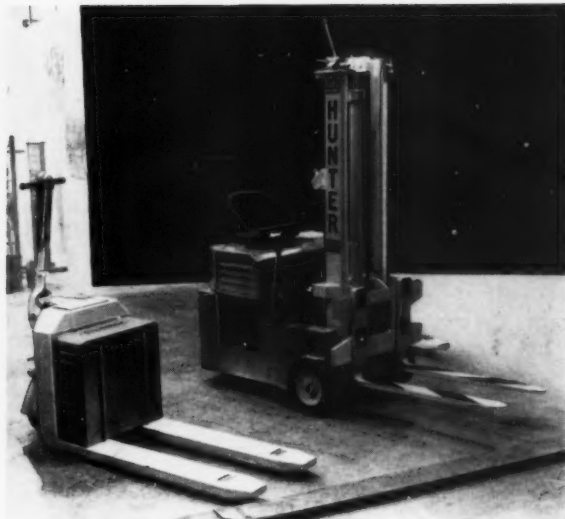
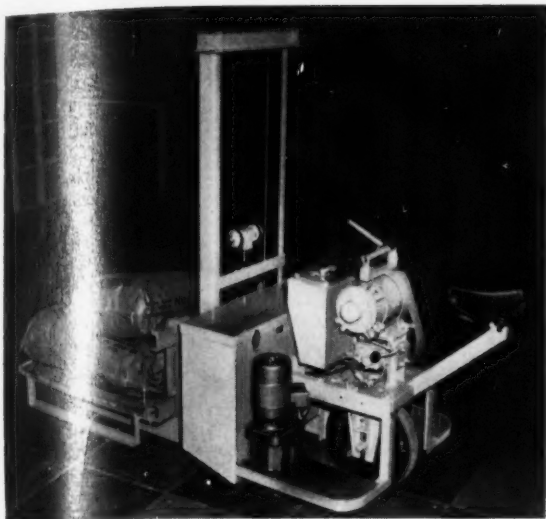
BELOW RIGHT

The Vertostacker on the stand of Powell & Co.

BELOW

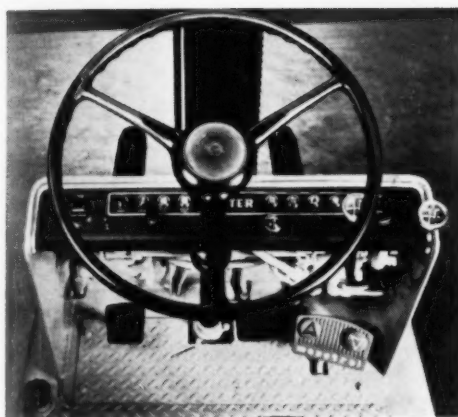
The Diamatic fork truck. Diac, Ltd.





ABOVE LEFT
Gramac Model 500A truck. Grading Machinery, Ltd.

ABOVE
The 'Piccolift' (right) and 'Pallimat' (left) by G. Hunter (London), Ltd.



LEFT
Operator's view of a new Hyster Spacesaver truck equipped with the Monotrol transmission system, and Monomast upright assembly. Fred Myers, Ltd.

BELOW
A rotating roll clamp seen on the stand of Shelvoke & Drewry, Ltd.

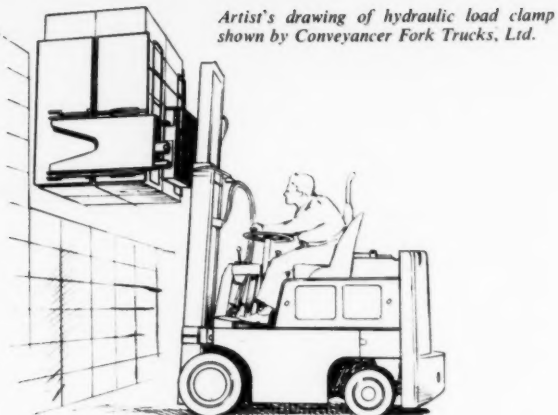
control. There are no hand levers of any kind except the cowl-mounted lever for load control.

Electric Pallet Truck

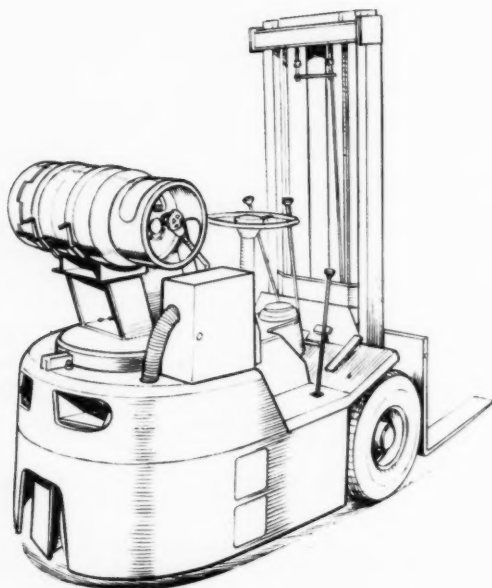
G. Hunter (London), Ltd., showed their 'Pallimat' 1-ton and 2-ton pedestrian controlled electric pallet trucks. This truck is electrically driven with a hand/hydraulic lift. Also shown was the 'Piccolift' fork lift truck of 1,300 lb capacity at 20 in. The chassis is a robust integral unit comprising an electrically welded frame, two cross-members and a strong steel plated external covering. The battery can be easily slid into or out of the truck at the right-hand side.

Conveyancer Fork Trucks, Ltd., showed the new 4-24 Series 3 fork truck. This new series has been designed to incorporate maximum safety, driver comfort, ease of maintenance, reliability and streamlined appearance. Many of the parts used are common to other trucks in the Conveyancer range and a choice of petrol, LP Gas or diesel engine units are available. A 'no-strain' driving/operating position is provided for the driver by a wide adjustable seat the height of which ensures maximum visibility in all directions. The gear change and hydraulic control levers are conveniently grouped for right-hand operation and coincide with natural arm movements. Powered by either a Standard Motor Co., series 23C diesel or 87-mm petrol engine and fitted with two-speed forward and reverse

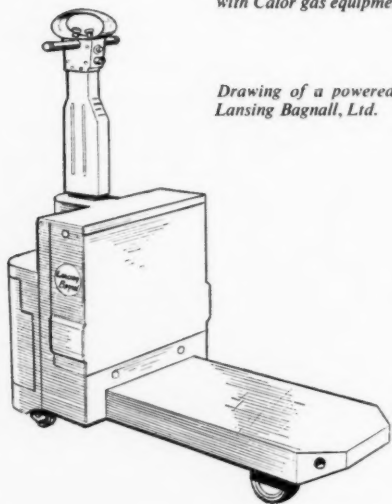




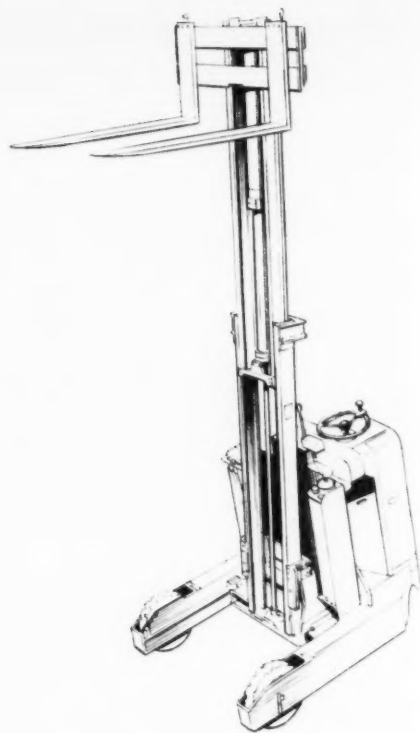
Artist's drawing of hydraulic load clamp shown by Conveyancer Fork Trucks, Ltd.



Artist's impression of Hyster fork lift truck with Calor gas equipment. Fred Myers, Ltd.



Drawing of a powered hand stillage truck Lansing Bagnall, Ltd.



Drawing of the 'Ameise Retrak' straddle reach truck shown by Jewsbury's Mechanical Handling, Ltd.

gearbox and a quickly detachable type clutch. The machine can handle loads up to 4,000 lb at 24-in load centre, the standard height of lift is 9 ft, but optional masts giving from 6 ft to 14 ft lift can be fitted. Full free lift masts are also available. A swing-back type body canopy is fitted. After depressing two spring load catches the canopy can be swung back over the balance weight to expose engine and accessories, etc.

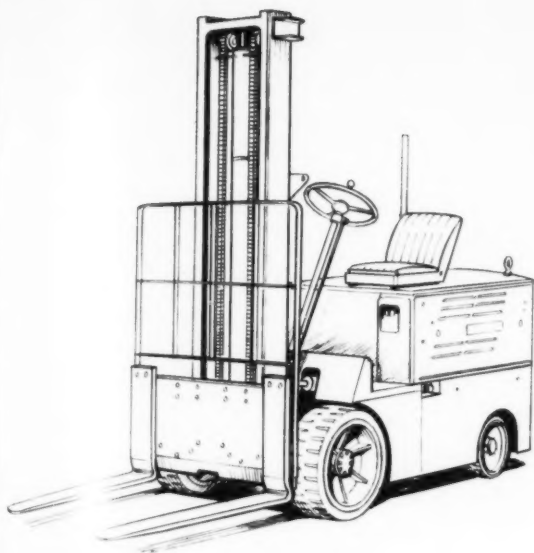
Also shown, for the first time at an exhibition, was the company's driverless tractor-trailer system called the 'Robotug'. In this connection a new marketing arrangement between Conveyancer and E.M.I. Electronics, Ltd., who supply the electronic equipment, has been concluded. Under this agreement Robotug systems will be marketed by Conveyancer-Scott Electric Vehicles, Ltd., fitted to their well-known tractors.

Rider Operated Stillage Truck

Wessex Industries (Poole), Ltd., showed an addition to their range of the above type of truck. This is model E734 of 2-ton capacity, made in low loading and high loading models.

Materials Handling Equipment (G.B.), Ltd., exhibited the new Irion 'Lizard' electric side loading reach truck. There are six models for long and cube shaped loads. The overall width is 48 in to 94 in and overall length (all models) 8 ft 4 in. Capacities range from 2,285 lb to 3,300 lb. These trucks can move forwards, backwards and laterally at right angles in confined spaces.

Two driving wheels—fore and aft of the unit—each powered by separate electric motors permit these wheels to be turned in any direction by a control in the driver's cab. The twin wheels on the 'T' section operate on the castor principle, and the truck turns in its own length.



An 8-ft aisle can be reduced to 5 ft by the wheel swivel of 90 deg. The 'Lizard' can proceed sideways in an aisle and move into and out of a stack without the necessity of clearing surrounding stacks first. Valuable storage space is thus utilized to the maximum.

Jewsbury's Mechanical Handling, Ltd., exhibited a selection from the range of Ameise 'Retrak' reach fork trucks, which have capacities of 1, 1.2, 1.5 and 2 tons at 24-in load centres. They can be supplied in five different types of mast, and with stand-on or sit-on driver. Lift heights are up to 20 ft and the machines are available in five different widths to suit particular loads.

Douglas Equipment, Ltd., exhibited their 'Cargomaster'. This futuristic looking vehicle, with its low slung front cab, reminds one of an aircraft, for which it is designed to serve. The overall length is 23 ft, the wheelbase 11 ft 10 in. The machine is equipped with a rising cargo floor for which the abridged specification reads as follows:

Hydraulically-operated cargo hoist platform to raise from 3 ft 6 in loading height to 12 ft. Drawbridge over cab to carry conveyor. Bridge fitted with adjustable handrail/safety rope, minimum height 39 in from ground. Rope to be adjustable to three positions 2 ft, 3 ft and 4 ft forward of the body. Portion of conveyor protruding into hold folds upwards as aircraft loading height increases. Main cargo platform has full width floor. Floor is divided in two portions, one 5 ft wide, the other 2 ft wide. Operation is as follows: (a) narrow section must move independent of broad section; (b) broad section must move independent of narrow section; (c) both sections move together and are synchronized. Floor is controlled at forward and rearward end of body for unloading and loading.

Rolatruc, Ltd., showed their new pedestrian controlled fork lift truck which, it is claimed, is the only truck of its type which will lift 1 ton at 24-in load centres—up to 11 ft. The truck is of rugged construction consisting of one piece steel pressings. It can be supplied with single, telescopic



TOP

Artist's impression of Stacatruc 624D diesel fork truck. I.T.D., Ltd.

LEFT

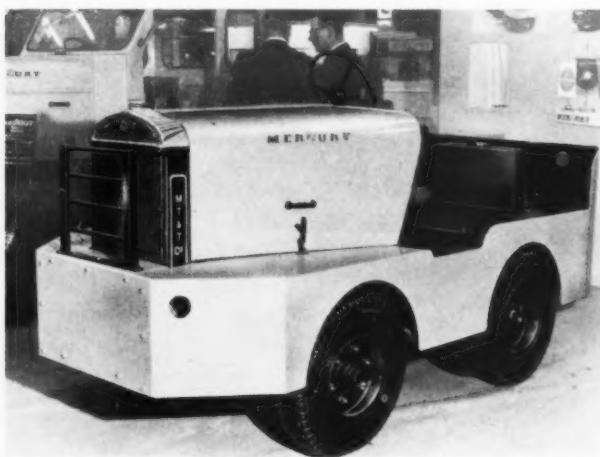
Artist's drawing of The 'Spacemaster' electric truck Series 'J'. Coventry Climax Engines, Ltd.

BELOW LEFT

The 'Teddy' tractor made by Omic, Ltd.

BELOW

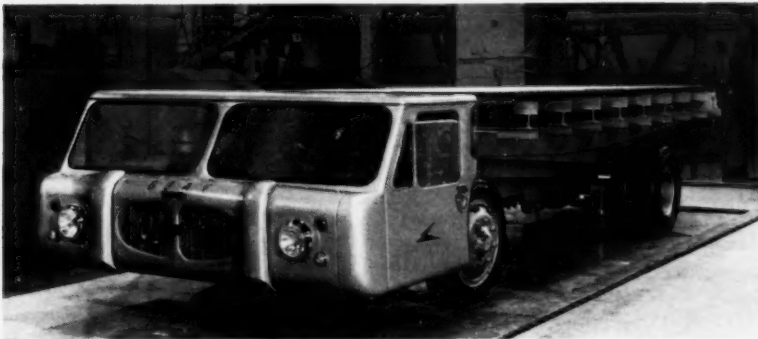
The Mercury model 40 P tractor. Mercury Truck & Tractor Co., Ltd.





30-cwt reach truck. Lansing Bagnall, Ltd.

The Douglas Cargomaster as supplied to B.O.A.C. Douglas Equipment, Ltd.



or high masts and all types of wheels—pure nylon, nylon-Bakelite, Bulkallon (synthetic rubber with a life comparable to nylon), steel and rubber. The total weight is only 9 cwt.

Grading Machinery, Ltd., displayed their new 500A 10-cwt power stacker, rider controlled from a saddle. It is fitted with a fixed mast to 8 ft 6 in and a drum lifting and tipping attachment will straddle a drum which is lying horizontally or vertically. This company are becoming specialists in drum and barrel handling and this truck has several features unusual for this size and priced machine—controlled tipping, tipping height selection, etc.

Attachments

I.T.D., Ltd., well-known manufacturers of Stacatrics, demonstrated a multi-purpose tyre-handling attachment which has been designed specifically for the rubber industry, and for use with a Stacatruc. The attachment can be used for stripping tyres in the green condition from moulds, as a ram, and for clamping, stacking and up-ending.

Shelvoke & Drewry, Ltd., Letchworth, Herts, displayed a rotating hydraulic roll clamp on a Freightlifter model 72 fork truck with a capacity of 6,000 lb, stacking up to 33 ft height. The clamp has 180 deg rotation and can handle roll sizes from 10 in to 60 in.

R. H. Corbett & Co., Ltd., Rochester, Kent, displayed the CL2 drum clamp which has a forward rotation from 0-deg-135-deg, for dispensing purposes. The capacity of the relevant truck is 5,000 lb at 20 in load centres. Such an attachment enables the feeding to hoppers at a height of 12 ft. For example: the truck moves forward with its load, faces a vat, raises the drum and discharges the contents forwards into the vat. The attachment will find particular use in the plastic and chemical industries.

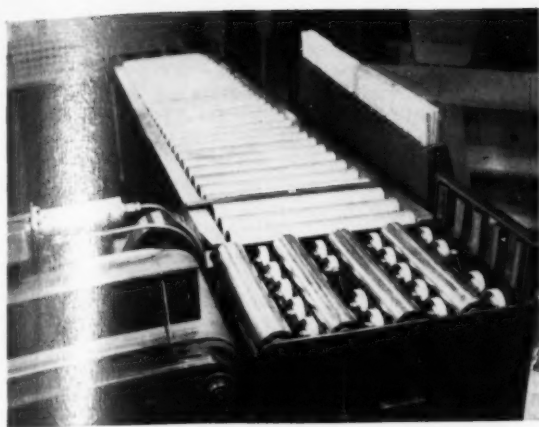


CONVEYORS

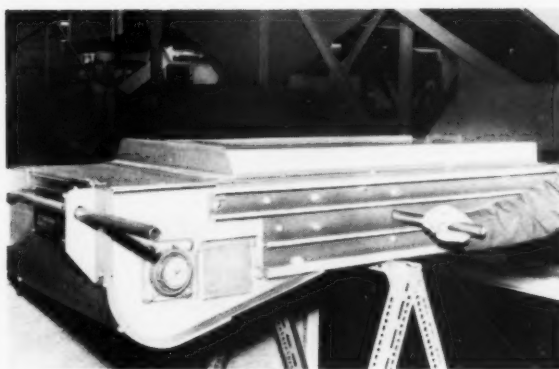
A TREMENDOUS wealth of new and improved conveyors and conveying equipment of all types was shown at this year's Exhibition and in some ways it was felt as if the industry had taken a major step forward both in specialization and quality of design and workmanship. Mobile conveyors were shown in greater numbers than ever before and amongst them were such improvements as machines with integral expanding booms, extra-wide wheelbase machines, special-purpose machines with magnetic devices for the handling of ferrous components, etc. Overhead conveyors too, seem to have suddenly become better than ever before. On the one hand there were much improved versions of long-established models, many of

them amazingly complex and complete with remote-controlled electronic control. On the other hand there were improvements in detailed design such as the use of nylon runners, simplification of construction such as the use of tubular steel runways, and improved jointing methods for rope-type overhead conveyors.

Paddle-type mixer conveyors were seen to be in process of developing into something quite new and many new uses of the principle of vibration in feeding and conveying were shown. There were many new types of conveyor belting and greatly improved idler systems. Conveyorized vehicles and loading decks were also much in evidence, as well as new and improved screw and spiral conveyors.



Right-angle tipping transfer unit. J. Collis & Sons, Ltd.



New light alloy conveyor showing through holes provided for handles. Crone & Taylor (Eng.), Ltd.

Prototype Electronically Controlled Batching Plant

A working exhibit of great interest was shown by Richard Sutcliffe, Ltd., a full-size prototype electronically controlled batching plant. This consisted of a conveyor circuit comprising two main conveyors, one electrically driven, the other hydraulically driven, together with a short cross-conveyor, a chute, belt weighers and a batch weight hopper. The purpose of the circuit was to demonstrate the most up-to-date methods of measurement and control, using hydraulic and electronic equipment.

The speed of the hydraulically driven conveyor is controlled through a variable speed hydraulic pump. The measuring devices record such information as the conveyor speeds, the weight of material in the batch hopper at any time, the total weight of material handled by the circuit, the rate of flow, etc. Many of the electronic circuits employed are unique in conception. For example, all the visual indicators in the equipment use direct digital read-out rather than the normal scale-and-pointer type of dial. The advantage is that readings may be taken at up to 40 ft distant, in the form of a complete number. Such indicators remove any ambiguity which may arise in counting scale divisions between cardinal points on a dial.

In operation, the plant may be set up to weigh out any amount of material up to 999 lb in increments of 1 lb. Immediately below the *set weight* switches are a further bank of switches marked *set creep*. The function of these controls is to enable the operator to set up a weight at which the conveyor will automatically reduce speed, so that overshoot will not take place when the desired maximum weight is reached.

A chart recorder is fitted to provide a continuous visual record of the rate of flow of material. The rate of flow or product signal is then further amplified and passed to an integrator whose function is to record the total quantity of material passing over the belt. Two units are provided in this section, one gives a direct visual indication of the cumulative total tonnage, whilst the other, on demand, will produce a printed record on paper ribbon.

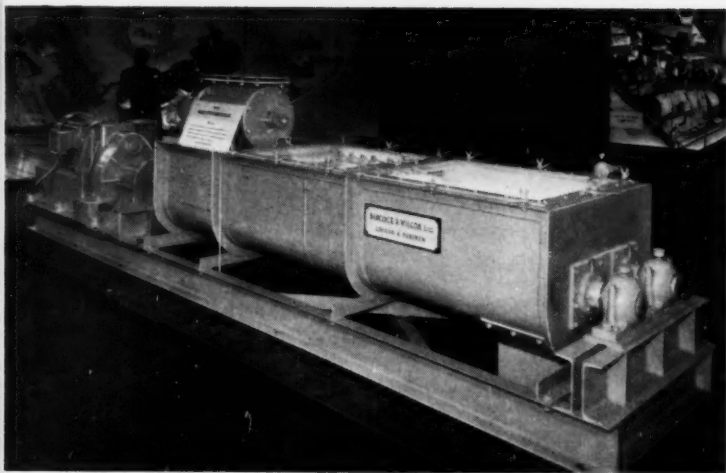
One unit is concerned with the measurement and control of belt speed. Speed measurement is truly tachometric in that a counting device generates a number of pulses for every foot of belt travelling past it and adds the pulses over a period of 15 seconds to give a reading directly in ft/min. The stored count is at the end of each period,



The stand of Redler Conveyors, Ltd., and Conveyors (Ready Built), Ltd.

The new MA mobile conveyor, 100 tons/hr capacity. C. H. Johnson (Machinery), Ltd.





Paddle-type mixer-conveyor. Babcock & Wilcox, Ltd.

held for 15 seconds, automatically set to zero and then the cycle restarts once again.

The hydraulic equipment incorporated in the circuit is supplied by Sutcliffe Hydraulics, Ltd., and the electronic equipment by Craven Electronics, Ltd., members of the Sutcliffe Engineering Industries Group.

Eliminating Belt Slip on Drums

Under wet conditions trouble has always been experienced due to belt slip on conveyor driving drums. This has now been overcome by the introduction of double-chevron neoprene bonding of drums, a method shown by Richard Sutcliffe, Ltd. This increases the coefficient of friction by more than 50 per cent as compared with unlagged cast iron drums. The bonding process has been applied to drums installed in wet and faulty conditions. Any drum can be bonded, provided there is sufficient clearance between the drums when assembled in the drive to allow for $\frac{3}{8}$ in thickness of neoprene on each drum and also the thickness of the belt. The shell must also be in reasonable condition with a workable thickness to allow for preparation before lagging. The bonding process is carried out by the Sutcliffe Moulded Rubber Co., Ltd.

An interesting multi-blade conveyor scraper was exhibited by Richard Sutcliffe, Ltd. This is designed to overcome problems associated with normal counter-weighted belt scrapers, e.g. inability to react quickly to variations in the belt line, and the tendency to wear excessively in the centre where the majority of abrasive material adheres to the belt. The latter produces a shallow trough in the edge of the scraper, which allows the majority of the material to pass through on the carrying surface of the belt. If this wear is allowed to continue long enough, wear can produce a notch in the blade, the width of the belt, which then constrains its lateral position and can produce heavy edge wear. The usual result is that the scrapers quickly become ineffective although the process can be slowed down somewhat by the use of a very wide scraper blade such as the back of an angle. Attempts have been made to minimize these problems by the use of adjustable rubber blades attached to the steel scraper, but as these are necessarily made adjustable they can become damaged through lack of rigid support.

A new machine on the V.M.E. stand was a light alloy skate wheel conveyor, a very tough-looking lightweight

machine indeed. Other exhibits include the following: a unit band conveyor; an all-purpose piler; and examples of the V.M.E. range of overhead chain conveyors. The unit band conveyor is made in standard lengths of 6 ft. It is easy to erect and is suitable for inspection, assembly work, packing, etc. The piler is a mobile conveyor and is available in flatbelt, troughed belt and slatted belt versions. Standard machines are 14 ft long and three belt widths can be obtained. The conveyor boom is adjustable for height and inclination, through manual-hydraulic rams. The machine is mounted on wheels and castors, and is extremely mobile.

Versatile Range of Conveyors

Some conveyor manufacturers prefer to specialize on design and production of conveyors for the handling of bulk materials. Others prefer to concentrate upon package conveyors, stackers, etc. A considerable number are in both fields simultaneously. One interesting example is the Universal Conveyor Co., Ltd., which offers a range of what might be regarded as complementary conveying equipment, suitable for complete handling systems and consisting of carefully selected special—and general-purpose conveyors and elevators of various types. Thus, at the exhibition Universal Conveyor Co., Ltd., succeeded in demonstrating their main items of equipment by means of scaled-down working models arranged to form two handling circuits, together with working models of mobile conveyors and one example of mobile conveyor design, full-size. Although the stand was quite modest in size, it was easily possible to appreciate at-a-glance the range of equipment on show and to discuss specific handling problems in terms of Universal conveyors.

Universal finger tray elevators are well-engineered machines and can be obtained in heights to serve any number of floors, complete with automatic feed and discharge, counting devices, etc.

Universal mobile conveyors are made in two ranges: (i) stackers, (ii) standard conveyors. A type L5 mobile conveyor was on show in full-size version. This machine has an 18-in grip faced rubber belt, discharge height

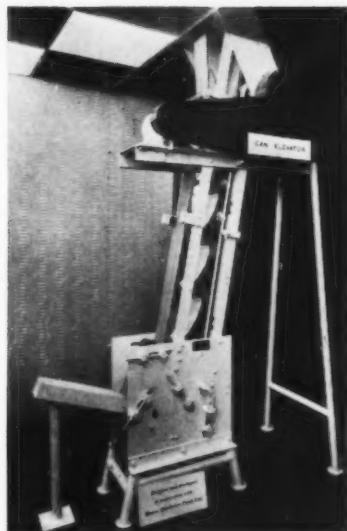
Horizontal bend of conveyor showing pan shape and articulating links, on the stand of Wharton Engineers (Elstree), Ltd.



Fluted mobile belt conveyor. Numec, Ltd.



RIGHT
A can elevator shown by
Gardiner's Conveyors, Ltd.



adjustment and electric motor driving unit. It is 12 ft long between centres. Reversing gear is available as an extra.

The integration of continuous handling and unit handling methods is at present being developed by hundreds of manufacturers and engineers, each putting forward one or two contributions. Often, the developments are amazingly simple and so obvious, that one wonders why they had not appeared many years ago.

One very interesting example of apparent simplicity of this kind was exhibited by Sir Armstrong Whitworth Aircraft, Ltd., on the Brush stand. This was the 'Rolamat' cargo handling system, which consists of a loading deck fitted with rollers. Units loads, both palletized and unpalletized, can be loaded directly on to this, and moved forward on to the deck. In addition, it is possible to fit 'Rolamat' rollers on to flat bed trucks or box bodies. This enables loads to be rolled directly from the vehicle to the loading deck, and back.

Logging Chains

Logging chains used extensively for transfer conveyors, carrying timber and sometimes packages, boxes and barrels, are now available from Bagshawe & Co., Ltd. Two

examples were exhibited. The same firm also exhibited a wide range of conveyor and elevator chains, as well as a section of heavy-duty conveyor for steelworks use and suitable for loads of up to 60,000 lb.

Spin-unit for Overhead Conveyor

Often, it is necessary to pass a piece of work in process along a conveyor line and to rotate it at the same time, as when carrying out shot blasting or spray painting. This can now be done by means of a Bagshawe overhead chain conveyor with a turning unit. The system was demonstrated at the exhibition and two versions are available. One, a lighter version was exhibited. This makes use of a simple rack-and-pinion-type action to rotate a hanger through 360 deg in 3 in of travel. As many rotations as necessary can be provided along the conveyor line. A second and somewhat more robust version is also available. This employs a power-driven chain which engages on a fixed sprocket on the carrier itself.

Swarf Handling

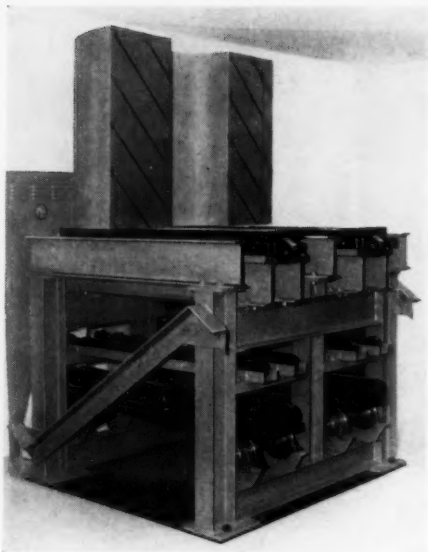
A number of firms now specialize in the design and manufacture of swarf handling plants. One firm, Bagshawe & Co., Ltd., exhibited a demonstration full-size assembly

The new Handveyor shown by A. L. Marshall (Carlton), Ltd.

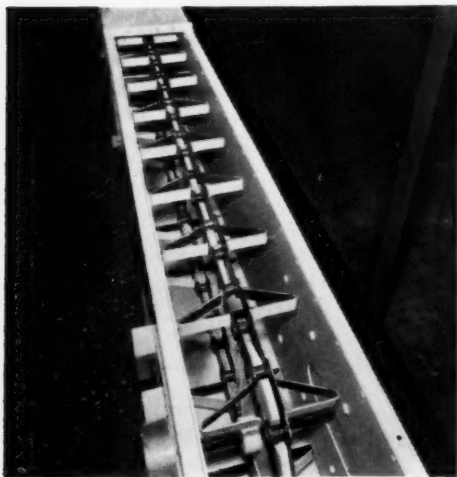


General view showing a climbing elevator on the stand of The Metal Box Co., Ltd.





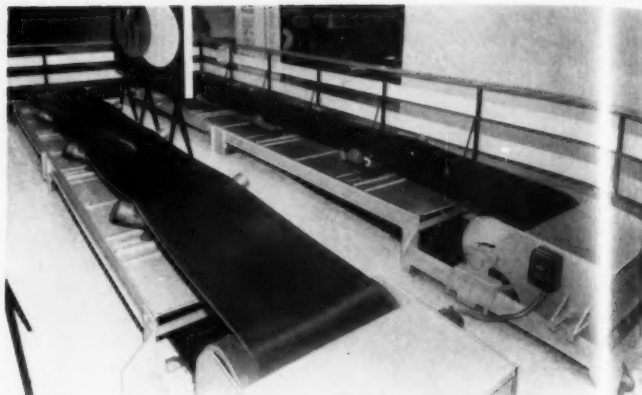
Section of a 10-ton Roll Race Conveyor. Albert Mann Engineering Co., Ltd.



The Linkalong conveyor shown by Thos. Robinson & Son, Ltd.

which incorporated two types of conveyor, a drag link conveyor and a tray conveyor. These fed one another and were shown handling cast iron swarf.

Bagshawe swarf conveyors can be installed above or below ground level and fed in various ways. In the case of tray conveyors, tray widths are usually between 12 in and 24 in. The width is determined by the nature, material and method of loading. Tonnage handled rarely affects conveyor width. As a point of interest it may be noted that tray widths do not greatly influence cost. Generally about 5 tons/hr is the maximum capacity required, even from a very large machine shop. Bagshawe tray conveyors can be used, also, for the handling of offcuts from shears and waste materials from power presses, etc. Often, units for these purposes are very much larger than those used for swarf handling.



Working exhibit of the P.V.C., rubber and nylon coal-mine belt conveyor. Dunlop Rubber Co., Ltd.

Bagshawe drag link conveyors are also used for swarf handling. The machine exhibited had a capacity of 5 ton/hr at 30 ft/min, when handling cast iron swarf.

Packaged Motor Control Units

Packaged variable speed motor control units were demonstrated by Albert Mann Eng. Co., Ltd. One of these was for single motors of 3 to 75 h.p. Another was for control of five motors. Both were for direct current motors and applicable to a wide range of mechanical handling plant. The five-motor unit included synchronization and integration functions. In addition, a fractional horsepower motor control unit was also shown. This, too, was in packaged form.

In each case electronic control is used. The Ameco pulse control system is employed and the unit is complete and self-contained. A continuously variable speed control is obtained for the whole range of the motor. Good starting stability is claimed over long periods of time, and under varying load conditions. The control system is fully interlocked.

Recently, Roll Race Conveyors, Ltd., was taken over by Albert Mann Engineering Co., Ltd., a firm specializing in rolling mill equipment. At the MECHANICAL HANDLING Exhibition, on the Albert Mann stand, interesting examples of Roll Race design were demonstrated. A scaled-down working model demonstrated the high mechanical efficiency of the conveyor system by means of a 3½-cwt load on a Roll Race sledge. This could be moved along its track by means of a spring-balance held in the hand, the reading at steady speed being only 3 lb. The makers claim that their conveying system is very low in cost for loads of 500 lb and more. The load is carried on sledges which rolls directly on solid rollers. The load by-passes the bearings, and is transmitted to the floor structure through solid rollers. Also on show on this stand was a section of a full-size Roll Race conveyor, in this case part of a 10-ton coil conveyor. A typical example of a large version of this conveyor is the 500-ton model. This requires only 15 h.p. for traction at 20 ft/min.

Nylon Conveyor Belts

Conveyor belting incorporating nylon was shown by British Nylon Spinners, Ltd. One exhibit was a length of

one of the first belts to be made from a duck composed wholly from nylon. This has performed well under arduous service conditions and has the great advantage that, besides being extremely strong and tough, it is also completely rotproof.

This nylon belt was one of a range of various types of belts from 16 leading British manufacturers, which were shown made up into a composite belt and installed on a 30 ft working conveyor. Between them they illustrated many of the ways in which nylon is now being utilized to produce stronger, tougher and more durable conveyor belting with a longer life and improved resistance to mechanical damage. Amongst them were the following: solid-woven belts incorporating a substantial proportion of nylon; plied belts with a nylon weft, originally developed to meet the requirements of the National Coal Board for belts with improved lateral strength but now being used extensively in other industries both at home and overseas; and still-tougher belts composed of nylon mixtures in both warp and weft.

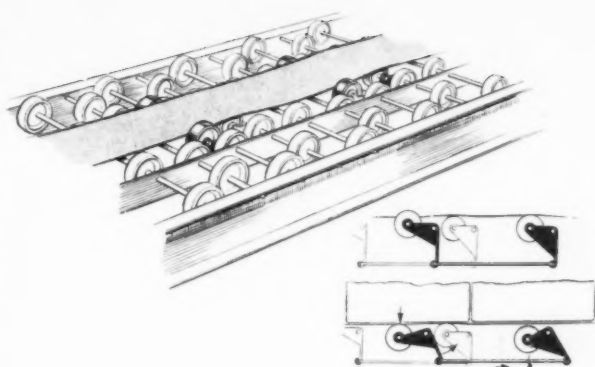
Nylon conveyor belts were shown, also, by The Goodyear Tyre & Rubber Co. (Great Britain), Ltd. These had nylon in the weft construction. Goodyear HDNF conveyor belting comprises a special weave that combines the proper balance of crosswise nylon fill yarns with cotton warp yarns running lengthwise. Numerous other types of conveyor belting were shown on the same stand.

Automatic Air-controlled Conveyor Set-up

The new automatic conveyor system at the E. K. Cole radio equipment factory, recently installed by V.M.E. Conveyor & Furnace Co., Ltd., was typified by a specimen conveyor set-up shown on the V.M.E. stand. This was operated by compressed air and it incorporated driven roller sections, table lifts and lowerators and junctions. The system is designed to suit the following requirements:

Items travelling along a driven roller conveyor can, at choice, be automatically removed from the conveyor via a side-operated lifting section controlled by a timer to give preselected timed performance. This permits operators adjacent to the conveyor to carry out predetermined tasks during a controlled time period. At the end of the allowed time after a warning sound and vision signal, the work is automatically removed and placed back on the original conveyor, or on a parallel 'reject' conveyor running below it.

A new light alloy belt conveyor shown by Crone & Taylor (Engineering), Ltd., was specially designed for use in gas



New type A.P.C. conveyor to eliminate bunching, drawn by our artist. Manufacturers Equipment Co., Ltd.

works, oxide purifier boxes and may have numerous other applications. The conveyor is built around a skeleton framework of rectangular steel tubes and is enclosed with extruded light alloy side plates. It is designed for both bulk and bag handling and has an 18-in dished belt running in a dished light alloy plate, the result being what could be described as a partially-troughed belt.

The conveyor is at present being made in 20-ft lengths between centres, but slightly longer versions can also be obtained, the maximum length being 24 ft between centres. Various running speeds are available, from 100 ft/min to 20 ft/min.

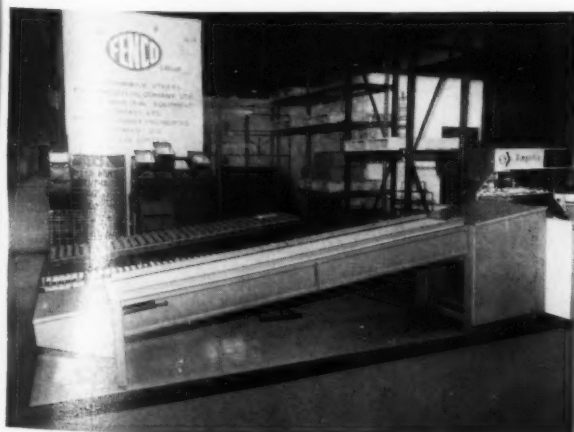
The new conveyor is very manoeuvrable with a team of men working together and it should prove to be very useful for attacking some of those more awkward handling jobs.

Also on show on the same stand were the following: a working model of a ship bulk loader, a new type of loading hopper and examples of Crone & Taylor mobile conveyors, throwers, as well as a mobile screening unit and a coal bagging chute.

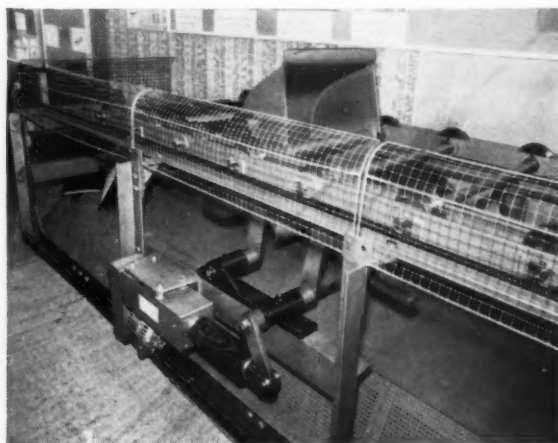
New Heavy-duty Conveyor Chain

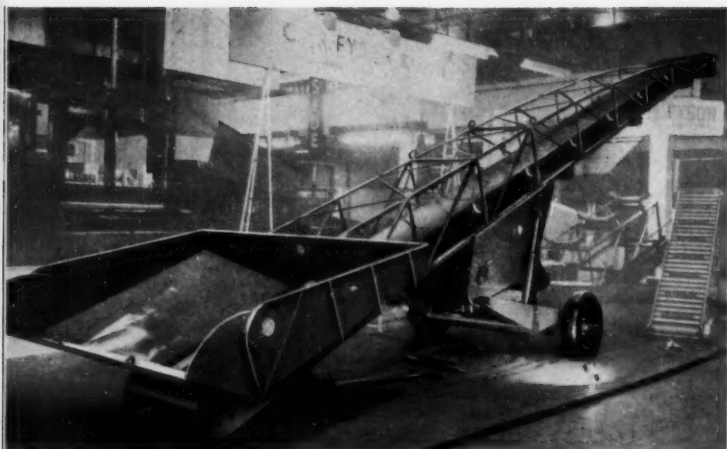
A new heavy-duty conveyor chain was exhibited by Ewart Chainbelt Co., Ltd. This was their model no. 1605/AAA. It is for heavy-duty conveyor use and has an ultimate breaking strength of 330,000 lb.

Inclined mobile conveyor. Finspa Engineering Co., Ltd.



Bucket conveyor thruster unit on the stand of West's Group of Industries





Model AB mobile conveyor. C. J. R. Fyson

Also on show was a very large capacity bucket and illustrations showing its use on a castings cooling monorail conveyor line in a mechanized foundry. The bucket was of about 27 cu. ft. capacity, with automatic tipping discharge of the castings after cooling. Many working models were shown on the same stand.

Vertical Spiral Elevator

A working example of the Ewart range of vertical spiral elevators was shown at the exhibition. Although already fairly well known amongst mechanical handling engineers, this machine deserves mention. It is fed by gravity chute and may be regulated by a short feeder screw. Elevation is by means of close-bladed helix. As compared with conventional bucket elevators several advantages are claimed. These include the following; shorter elevator height for the same material elevation height, reduced explosion risks, self-cleaning.

The British Wedge Wire Co., Ltd., exhibited a new type of belt conveyor, their Omniflex model which employs pressed steel belt components and is particularly suitable for contoured conveyors handling packages. It is available in widths of up to 24 in. One drive unit is all that is required for a complete conveyor system.

The belt components are of castellated form, with pin joints arranged along the overlapping axes of adjacent staggered units. The pins pass through elongated holes in the pressed steel belt components and these permit flexing, enabling the belt as a whole to turn curves with ease whilst still running horizontally.

The Wedco Lowerator shown by the British Wedge Wire Co., Ltd., operates almost as if perpetual motion were 'round the corner'. The lowerator is for use between conveyor lines separated by vertical drops and it provides a controlled lowering movement without shock. The action is completely automatic and up to 400 loads may be handled from floor to floor. Total space requirement is only 8½ sq. ft. and no maintenance is required. Nor any power supply. Action is by means of a self-loading pneumatic ram. The weight of the work descending from one level to another is sufficient to recharge the ram and thus raise it back to the top position.

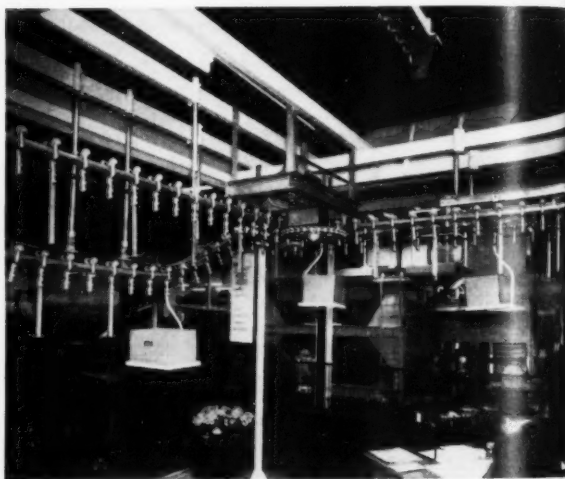
Nylon and Cotton Carcased Belt

Latest development on the stand of the Silvertown Rubber Co., Ltd., was a coil of cotton and nylon carcased P.V.C.-

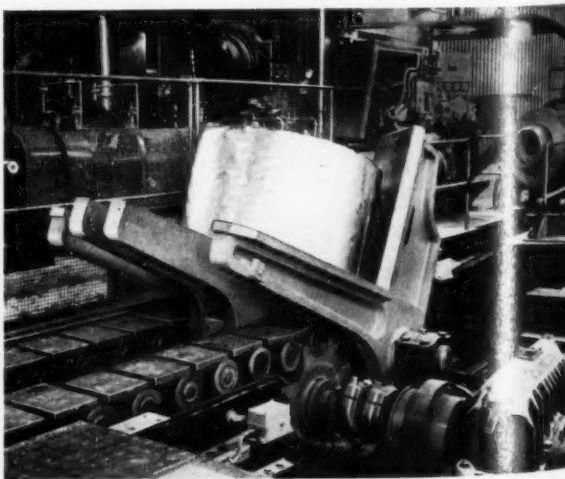


Vibratory conveyor shown by Cutler Conveyor Co.

Tubular steel runway overhead conveyor. Stewart Gill & Co., Ltd.



Hydraulically operated coil tilting machine for feeding coils of steel strip on to a coil carriage feeding a temper mill in a modern plate works. The conveyor was shown at the Exhibition by Bagshawe & Co., Ltd.



covered conveyor belting for coal mine use. This has been under development for some time and it has now secured limited approval from the National Coal Board. The new conveyor belting is available in a full range of widths of up to 54 in.

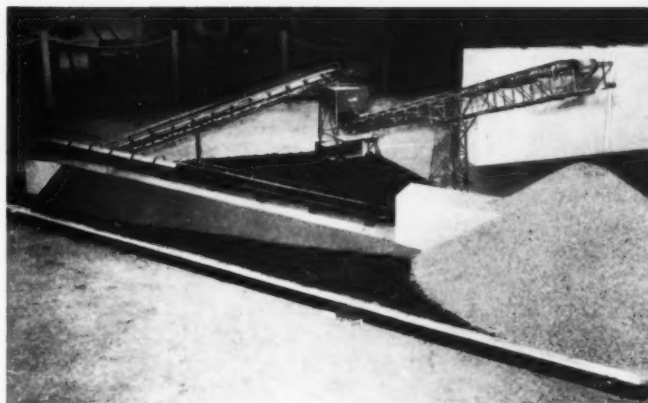
Automatic Tramp Iron Remover

An interesting device shown on the stand of Electromagnets, Ltd., makers of Boxmag equipment, was never seen at previous MECHANICAL HANDLING Exhibitions although not unknown in certain branches of industry. This was the Boxmag magnetic head for belt conveyors, which is fully patented. It is designed to remove metal from foundry sand, reject tramp metal from colliery output, plastic material, animal feeding stuffs, etc. Operation is by means of a built-in electromagnetic system and a series of non-magnetic rollers. The normal conveyor throughout is handled in the ordinary way and the tramp iron, etc., is magnetically prevented from joining in the output stream but travels somewhat further round the contour of the conveyor to be discharged into a separate tramp iron hopper.

An interesting inclined belt conveyor was exhibited by Finspa Engineering Co., Ltd. This was one of a series of custom-built conveyors made by the firm and constructed from standard components. The machine shown was a flat belt machine with a plastic-covered belt. The same firm also showed a number of lightweight roller conveyors. More recently, they have developed a new addition to their range of equipment; a troughed belt conveyor for permanent installations.

Floor-loaded Mobile Conveyor

A mobile conveyor designed for easy loading from the floor was shown by one of the oldest firms of conveyor manufacturers, S. S. Scott, Ltd. This machine was one of several custom-made machines made by the firm. Although of fairly conventional layout, being of the manual-pneumatic type with a castor-mounted carriage, it was noteworthy for a number of features; the rugged construction which was not excessively heavy, the use of wooden slats along each edge of the rubber conveyor belt, to ease loading, and the really floor-level loading height, enabling sacks, etc., to be handled without trouble. The conveyor had a maximum lift of 18 ft and was able to handle sacks of more than 1 cwt. Also on show were examples of this firm's spiral conveyor construction and a specimen elevator.



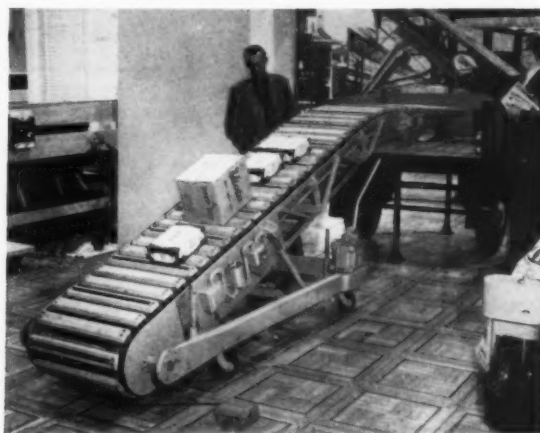
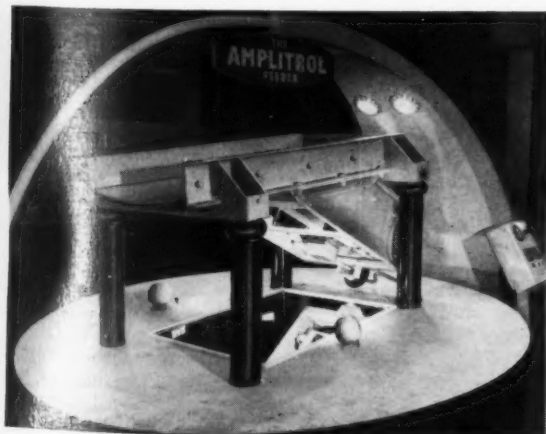
The Universal Conveyor Co., Ltd., working model of a bulk handling system, showing inclined conveyors, ground conveyor, stockpile and concrete feeder tunnel in base of stockpile

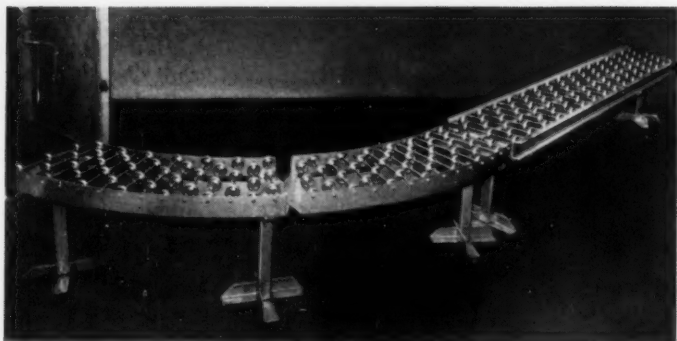
A liquid proportioner shown by Simon Handling Engineers, Ltd.



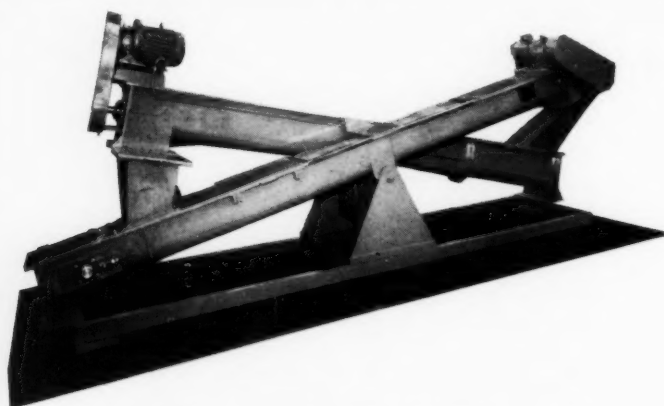
The Amplitrol pneumatic control system feeder. Locker Industries, Ltd.

Demonstrating a swan-neck mobile conveyor loading a truck. Fourways (Engineers), Ltd.

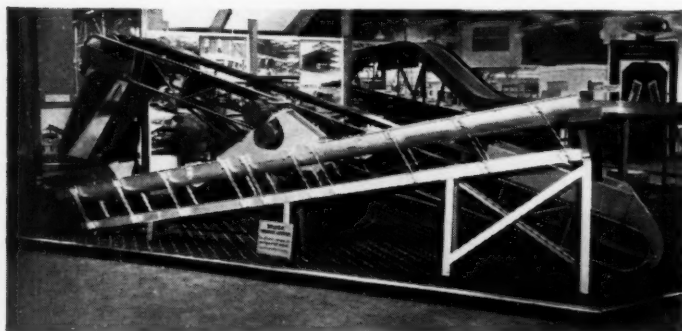




V.M.E. light alloy skate-wheel conveyor. V.M.E. Conveyor & Furnace Co. Ltd.



The Superflow conveyor shown by W. S. Barron & Son, Ltd.



In the foreground can be seen the Ensign vibratory conveyor shown by Thos. W. Ward, Ltd.

Linkalong Chain Conveyor

A chain conveyor now in production in Britain, was shown by Thomas Robinson & Sons, Ltd., their Linkalong machine. Although new to Britain this conveyor has, in fact for some time been in production in the Australian factory of the firm. The new conveyor is for the handling of grain and flour and may have other applications too. The makers are prepared to run tests for this purpose. It is designed for powdered and granular materials in general and is claimed to have a long life and low cost maintenance.

It can be floor or ceiling mounted and is enclosed in a metal case. A simple chain tensioning device is fitted and intermediate delivery outlets can be provided. Available sizes are as follows: 6 in to 16 in, 1,160 to 5,000 cu. ft. capacity, and in any required length.

The Robinson-Elliott low-pressure pneumatic handling system was shown on the stand of Thomas Robinson & Son, Ltd. This is designed for the handling of granular and powder stocks and is of interest to mechanical handling engineers in all branches of industry because of the following claimed advantages: easy installation in existing buildings, power consumption requirements varying with load, reduced space requirements, reduced maintenance, relatively low height required above bins, and simplified control.

Rubber and Plastic Belting

A working exhibit on the Dunlop stand showed their latest P.V.C., rubber and nylon coal belt conveyor. This has nylon in the weft construction and is available in widths of up to 72 in. In addition to standard folded carcass construction this belt is available with the Dunlop patented Flexlol edge, with breaker piles or in a stepped ply construction. Many advantages are claimed for the new belt, amongst them the following: better troughing and ability to run on smaller pulleys, higher impact resistance, greater tear resistance, reduced number of plies and hence reduced weight, increased flex life, high belt weft strength, and lower cost per ton carried.

A new type of conveyor belt was shown by Numec, Ltd., their Numec fluted edge box-type conveyor belt, which is available for use by conveyor manufacturers and is also used in the Numec range of mobile and other conveyors. The new belt is made for the firm by Dunlop's and it has numerous advantages, amongst them the ability to operate at very steep angles of inclination and increased carrying capacity.

It is also available in food-quality rubber.

A new British-made mobile belt conveyor was shown by Numec, their Numec Standard machine. This is a robustly built machine and uses a fluted-edge box-type belt. It is a heavy-duty machine and has a 24-ft conveyor boom and hydraulic elevation. Also on show on this stand was a Numec Prefabor horizontal belt conveyor which also uses a fluted-edge box-type belt.

Bucket Conveyor Improvements

Lipped bucket conveyor improvements were shown by West's Gas Improvement Co., Ltd. One of these was the new Tully servo-electric thruster for operation of tipping buckets through a cam mechanism. Another was a prototype grease-pressure dispensing unit for lipped-bucket conveyor axle hubs.

A new type of self-lubricated conveyor-troughing idler system was shown by West's Gas Improvement Co., Ltd. This was their Camberoller system which has impact-resisting rubber rollers bonded on to mild steel journal bearings broached to a glass finish. The rollers are mounted on independent oil-impregnated bronze bearings and sealed by leather seals and flexible shrouds. Advantages of the new design include accurate tracking due to the permanent inclination of the idler spindle and avoidance of drag of outer rollers.

Helicoid Flights

An interesting range of helicoid conveyor flights was exhibited by Helicoid Flight Conveyors, Ltd. This firm makes a wide range of flights for conveyor manufacturers and also produces a number of conveyors. Amongst the flights on show the following are worth special mention: a 14-in ribbon flight, a 9-in standard flight, and a 9-in

tapering flight used for the feeding materials from bins in order to provide even control along its length. Also on show was a large-scale photograph of a new British application. This is for farm use and it consists of a pair of animal feeding troughs arranged back-to-back as a composite whole, with a Helicoid flight conveyor between. The feeding trough is for cattle and although new to the United Kingdom has been in use in the U.S.A. The conveyor handles silage, etc., and even feed to the various feed positions along the troughs is obtained by using tapered ducts at the bottom of the conveyor for entry of the feed to the troughs.

Curved-Pan Conveyor

The curved-pan conveyor available from Wharton Engineers (Elstree), Ltd., is now well known in Britain. Recently a number of important improvements were made to its design and construction and these were featured at the exhibition. One improvement is the use of segmented driving sprockets. These are now made in three segments and can easily be removed and changed from a conveyor without breaking down the whole machine. The sprockets are expendable and are deliberately made softer than the conveyor chain and easy changing is certainly an important advantage from a maintenance point of view. Another improvement is the altered profile of the driving sprocket. This now has flats to accept the conveyor chain links. The advantage is due to the fact that as the sprocket teeth wear down the diametrical pitch of the sprocket remains unchanged, thus extending the useful life of the sprocket and hence the time between overhauls.

A further improvement is due to the use of improved curved pans. These are now made with a slightly different shape and with articulating links in the chain. As a result it is now possible to bend the conveyor through sharp horizontal bends, as when having to avoid columns and machines in a factory. Further improvements are under development.

Canning Mechanization Advisory Service

The Metal Box Co., Ltd., has, for many years, designed and made mechanical handling equipment for its own factories and for the factories of its customers. At the exhibition this firm displayed details of its food products factory-layout advisory service and examples of Metal Box Conveyors.



Control console for Richard Sutcliffe prototype electronically controlled batching plant. Richard Sutcliffe, Ltd.

These were highly specialized equipments and most impressively arranged.

One new development on show was a climbing elevator for cans and other containers. This was a 400/min inclined elevator with electronic controls for the following: automatic ejection of cans without lids, to eliminate visual checking; automatic counting and batching; and trade-pressure relief, to avoid damage to cans by elevating cables.

Other Metal Box conveyor exhibits were as follows: (i) A return-flow bagging unit for pre-packing of produce, with four to 10 stations and pneumatically operated gates and scales. (ii) A standard unit belt conveyor with Gripface belting, made in 6-ft standard lengths. (iii) A magnetic elevator for small metal objects, loose components and small quantities of metal parts in bags. This machine is completely self-contained and is available in mobile form.

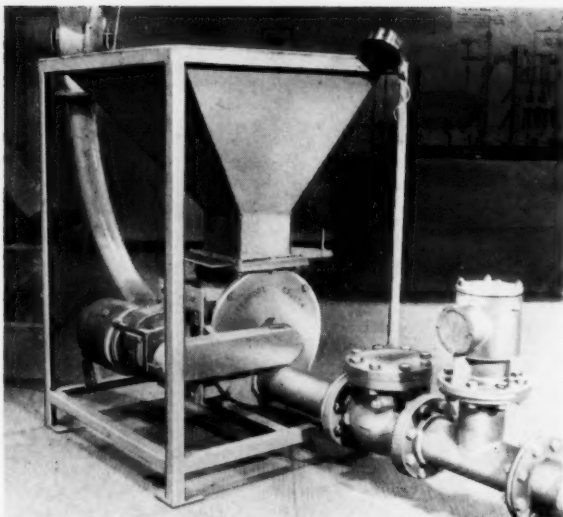
Simplified Overhead Chain Conveyor

The interesting feature of mechanical-handling equipment design is its unlimited scope for further simplification. A case in point is the new overhead chain conveyor now available from Mann (Handling), Ltd., a subsidiary of Dickson & Mann, Ltd. The former firm is a recently established manufacturing company, but the latter, the parent firm, is old established in the mechanical-handling industry. At the exhibition Mann (Handling), Ltd., showed their new Mannplaner overhead chain conveyor, a patent for which has been applied. This is designed for loads of up to 100 lb and is easily erected. It is expected to prove popular amongst many users because of its simplified design. Thus, the chain links and load hangers are independently supported; the load hanger is supported on its own runway track, not from the conveyor chain. There is a single-guide wheel system, instead of the more usual two-wheel arrangement. The conveyor is enclosed by a single-piece track section designed to exclude dust from the chain and act as a partial drip tray. The load trollies are fully castored to reduce wear on horizontal bends. Drive units have 10-tooth sprockets with load carrying rails, allowing loads to be passed through the drive.

Ninety per cent coverage of all mechanical-handling requirements by means of standardized components is claimed by Renold Chains, Ltd. That this is no idle boast

Bench-type conveyor with ground level loading position. Rendale Conveyors, Ltd.





High-pressure pneumatic intake valve shown by F. E. Callow (Engineers), Ltd.



Demonstration of Sprag clutches shown by Renold Chains, Ltd.

was proved by this firm's spectacular display of conveyor chains and attachments. One panel showed the way in which the Renold stock range of conveyor chains is arranged in chains of seven different breakage load ranges, each with a variety of pitches, and each in turn having a range of standard attachments. Renold chains are available in ultimate strengths of up to 85,000 lb. A number of new developments were also shown. One of these was a new conveyor chain of 45,000 lb ultimate strength and with K2 attachments. Another interesting exhibit on this stand was the Renold Sprag clutch system which is an ingenious and highly compact mechanism suitable for linking conveyors and processing equipment and having in-built facilities for over-running, indexing and backstopping.

Conveyor Beltings with Synthetic Fibre Carcases

Recent developments in conveyor belting designs have been in the direction of increased use of synthetic fibres in carcass construction. Turner Brothers Asbestos Co., Ltd., for example, exhibited a range of special type carcasses using synthetic fibres, such as Rayon, Nylon and Terylene, as well as new food quality beltings.

Leather-Nylon Belts

One unusual conveyor belt exhibit was that shown by Stephens Belting Co., Ltd., makers of Miraclo transmission

and conveyor beltings. A power press was shown with a take-off conveyor driven from the eccentric of the press. This demonstrated the good surface friction of the belt, an important property when carrying light metal items up an incline. Another demonstration model was arranged to show the steep angle of inclination possible without loss of carrying capacity. Stephens conveyor belts are a development of their transmission belts. Some years ago they introduced a new transmission belt with chrome leather face and heavy nylon centre. This commenced to find application as a conveyor belt by purchasers and on being asked why so expensive a material was used for conveying, the belt makers were told that the belting could carry out work not possible with other types of belting. Be that claim as it may, it is a fact that this material has the following important advantages: it does not stretch, it can stand temperatures as high as 160 deg F., it is not affected by oil, nor by water, it is elastic but has a minimum of stretch. Stephens Belting Co., Ltd., have placed a range of beltings on the market specifically for conveyor duties and these can be obtained in widths of up to 30 in. Textile-faced conveyor belts with solid nylon centres are also available.

New Food Quality Beltings

Gandy Ltd., makers of conveyor beltings, have now so large a range of beltings that it has been necessary to reconsider the entire question of nomenclature. In future, therefore, this firm will employ a unique system of identification for its belt products.

A new range of food quality conveyor beltings was shown by Gandy Ltd. One of these was their Polywocotring range of belts. These are ringed plastic coated beltings with raised rings for inclined conveyors. They are oil resisting, non-toxic, and available in widths of 9-in to 36-in. Another new range, the Crossrib belting range, had cotton ribs across the belt and is available in widths of 6-in to 24 in, with a choice of finishes. An ordinary cotton-carcased belting with Terylene ribs was also shown, the Proudrib range. The ribs are woven in longitudinally and the beltings are available in widths of 9 in to 12 in with a variety of finishes.

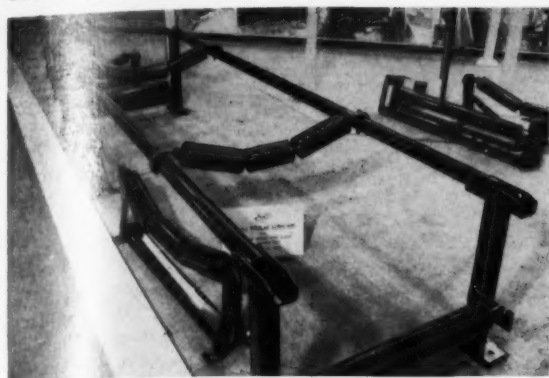
A self-troughing belt was another exhibit, the plastic Sidewall belting. This is designed to prevent spillage and is available in base widths of 6 in. to 24 in. Two other new beltings deserve mention, although these were not exhibited. These are: the Hyduck single canvas plastic-covered belting.

(Continued on page 413)

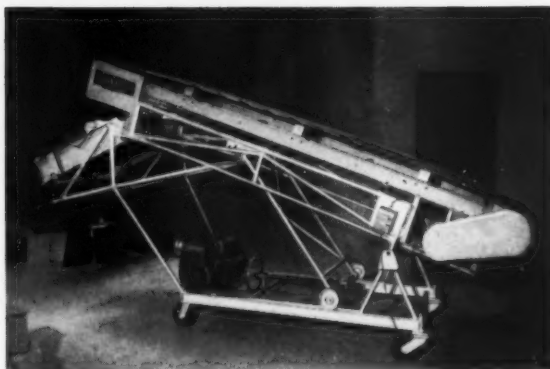
New roller turntable shown by Dexion, Ltd.



CONVEYORS—continued



Meco suspended idler structure. The Mining Engineering Co., Ltd.



Combined mobile conveyor and vibrating screen. E. P. Allam & Co., Ltd.

suitable for use where the working temperature is as high as 250 deg F; and, a new very low temperature P.V.C.-covered belting.

Steel Cord Belting

A new type of conveyor belting was exhibited by Barrow Hepburn & Gale, Ltd., their Mitcham steel cord belting. A sample on show was claimed to possess the strength of 30 plies of 32-oz cotton duck. The new belt has no fabric whatsoever, steel cords being used instead. These are equidistant from top and bottom surfaces and run in west direction only, the belt itself being of tough rubber. The rubber on and around the steel cords is vulcanized as a solid mass. Two other interesting developments were shown. One was the Mitcham range of synthetic duck conveyor belting. The other was the Wagener portable vulcanizing unit for rubber and P.V.C. repairs and jointing. This is claimed to give a shorter vulcanizing time and to enable a single cure to be used in many instances. Also on show were samples of the firm's conveyor belting using Terylene/cotton and cotton/nylon carcass constructions.

Mobile Conveyor/Elevator

A well-designed mobile conveyor/elevator was shown by Grading Machinery Ltd. the Gramac mobile conveyor elevator, which is available with booms of 16 ft, 20 ft and 24 ft. The machine has hydraulic elevation, will elevate to a height almost equal to boom length, conveyor horizontally at 6 ft level, and depress to below ground level. It is designed for 2 cwt unit loads and a maximum distributed load of 6 cwt.

Special Conveyor Chains

A wide range of conveyor chains was shown by Hartcliffe Chains, Ltd., amongst them a number of interesting special chains. These included the following: a creeper chain for the National Coal Board, an extended pin chain for food machinery, light conveyors and the like, and orthodox chains with special attachments.

A well designed but apparently simple oscillating conveyor was shown by the Cutler Conveyor Co., the Cutler Convey-Away. This is designed for handling materials such as salt, fertilizer, stampings weighing up to 56 lb, swarf, food, etc. There was practically no floor vibration from the machine.

New Range in Motorized Drums

New Thorite motorized conveyor drums were shown by Richards Structural Steel Co., Ltd. These included the

following: (i) the Junior Thorite, of 3/16 h.p., 30 lb ft max output torque, and available for 5 to 250 ft/min speed range; (ii) 20 h.p. Thorite motorized drums; and (iii) a sprocket-model Thorite motorized drum for chain-driven conveyors and elevators.

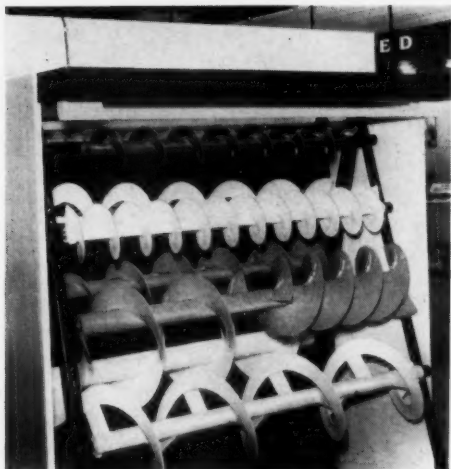
Shown for the first time by William E. Cary, Ltd., was an industrial version of their mobile conveyor used for grain handling. The new conveyor is mobile, with a four-caster



Rotary paddle feeder. Mitchell Engineering, Ltd.

The Huwood featherbed idler. Hugh Wood & Co., Ltd.





Display unit of rotating flights shown by Helicoid Flight Conveyors, Ltd.

carriage and 20 ft boom with 14 in belt. Belt speed is 70 ft/min and load capacity is 250 lb, distributed and 112 lb single, the maximum angle of elevation is 35 deg. The new machine is light and strong, with turnbuckle-type elevating gear.

A heavy-duty floor conveyor developed for the handling of rolls of paper in printing works is now being offered for general use in industry, especially chemical, textile and brewing industries. The conveyor was shown by Promecon Manufacturing Co., Ltd. It is called the PML roller conveyor and occupies no floor space. Handling is by means of a dolly or sledge of light alloy and this runs on power-driven rollers.

Coal Handling

Charrols, Ltd., specialize in handling equipment for coal merchants and displayed photographs showing coal-handling methods ancient and modern. At the near-by Warwick Road depot of the associated firm, Charringtons, a full-scale continuous display of the equipment was shown working. The equipment shown included the latest type mobile conveyors and bagging and loading hoppers, as well as bulk conveyor lorries, push-button bag-filling hoppers and the Autobagger, a conveyORIZED lorry with conveyor-fed weighing machine and bagger.

The Dexion Group aroused some amusement during the exhibition by means of a passenger-carrying conveyor system round the top of their stand. This was used with an attractive lady passenger to draw attention, which it did. Later, however, the lady was replaced by a large teddy bear. The exhibit was designed to focus attention upon Dexion Glidewheel conveyor components. Another interesting exhibit was a ball table, used by Dexion contract engineers as a conveyor feed table, etc.

Paddle-Type Mixer Conveyor

The Babcock paddle-type mixer-conveyor has been in use for some time now, for the handling and wet-conditioning of boiler fly ash. It was shown working at the exhibition on the stand of Babcock & Wilcocks, Ltd., and it is understood that new applications of this well-tried machine are envisaged. One might well be for the handling of concrete, possibly in the form of a continuous concrete mixer and dispenser.

Paddle Extractor

Another interesting paddle-type machine was shown by Mitchell Engineering Co., Ltd., their paddle-type extractor, a duplicate of a machine constructed for High Marnham Power Station near Retford. This machine extracts granular material from any length of hopper shelf and consists of a multi-blade rotating plough mounted on a travelling carriage. At High Marnham three-bottom discharge coal wagons are simultaneously discharged into a track hopper and coal extracted from the hopper by the rotary paddle feeder.

New and Improved Mobile Conveyors

An interesting new development was shown by Manufacturers Equipment Co., Ltd., makers of Rapistan handling equipment. This was their Magnetic Press-Vactor, a strongly built mobile transfer conveyor for the automatic handling of iron and steel parts from power presses to collecting bins. It is electrically operated and easily moved from point to point by one man. Because of its small size and unusually steep working inclination—up to 72 deg as a magnetic bed, is used—operation in very confined spaces is possible.

Another new development was shown by the Materials Handling Division of C. H. Johnson (Machinery), Ltd., their



ABOVE
Mobile conveyor showing floor pick-up. S. S. Stott, Ltd.

BELOW
Mobile conveyor on the stand of William E. Cary, Ltd.





New Vulcan mobile conveyor with 7 ft 7 in elevation and suitable for 1½ cwt. T. & T. Works, Ltd.



Light dual-duty overhead chain conveyor with control panel. Geo. W. King, Ltd.

improved and redesigned model MA, Mark 2 mobile conveyor. The new machine is available with a range of boom lengths from 30 ft to 42 ft., with belts 16 in to 24 in wide, suitable for load capacities ranging from 50 ton/hr to 116 ton/hr at 300 ft/min belt speed, at maximum elevation when handling material at 50 lb/cu. ft. Improvements in design and construction include the following. The conveyor boom is now all-tubular, of increased depth and monocoque construction. It is a continuous structure of increased rigidity and reduced weight. The belt, hopper and flare plates are now physically protected by being sunk inside the boom depth. The drive includes a new type of swivel mounting for the gearbox. This enables the gearbox to swivel with the drum and so keep in line.

Extendable Mobile Band Conveyor

A new type of extendable mobile band conveyor, the Extendarveyor, was shown by A. L. Marshall (Carlton), Ltd., and is also available in stationary form. The new machine is for horizontal or inclined use and a similar horizontal machine mounted on wheels is available for use on loading platforms, etc. The new conveyor is reversible and has a maximum overall length of 25 ft and retracted length of 17 ft. Maximum angle of inclination is 28 deg. It is suitable for lorry loading and discharging and should be very useful for warehouse and transport depot mechanization schemes. The conveyor can feed through openings and continues to feed whilst altering the effective boom length, as when retracting in or out.

Three new mobile conveyors were shown by T. & T. Works, Ltd. One of these was their Vulcan machine, suitable for elevating 1½ cwt paper or hessian sacks up to a maximum height of 11 ft 6 in. This machine has a grip-faced belt, is motor driven and has manual lift control. A second new machine by the same maker was their new-design sack piler, suitable for sacks of 2½ cwt. This was a hinged-boom conveyor with a Thorite driving drum and electric-hydraulic elevation. The boom has a discharge height of up to 20 ft. The third machine on show was a 24-in mobile troughed-belt conveyor with moulded flights and a 9 ft wide feed boot. It is capable of receiving material from 10-ton tipping lorries or overhead grabs and will handle 100 ton/hr at maximum elevation.

Wide-wheelbase Mobile Conveyor

An unusually wide-wheelbase mobile conveyor was shown by Bennis Combustion, Ltd. It was their Pegasus Load-stacker, suitable for heavy coal and coke-handling duties and previously made by J. W. Teal, Ltd., a firm taken over by Bennis about one year ago. The Pegasus conveyor is available in a range of sizes and load capacities and is a combined mobile low-loader and stacker. In addition to normal steering gear, the four wheels upon which it is mounted can be swivelled through 90 deg for lateral movement or arcing.

Mobile Conveyor with Larger Overhang

The advantages of a larger mobile conveyor in a smaller machine are claimed for a new machine shown by C. J. R. Fyson & Son, Ltd., their model AB mobile conveyor, which

Close-up of links at a curved section on the new Omniflex pressed-steel belt. British Wedge Wire Co., Ltd.



has a 40-ft boom and an overhang of 22 ft 9 in at 14 deg inclination, and 21 ft at 24½ deg. The new machine is a troughed conveyor with its own loading hopper, mounted on pneumatic-tyre wheels and engine-driven. It has a 24-in belt and 8-ft 6-in wide loading hopper.

New Swan-neck Lorry Loader

A new swan-neck mobile lorry-loading conveyor was shown by Fourways (Engineers), Ltd., their model LW machine, an improved version of a well-known machine. The addition of a swan neck improves the handling and loading facilities of the conveyor, enabling it to reach right into vehicles without difficulty.

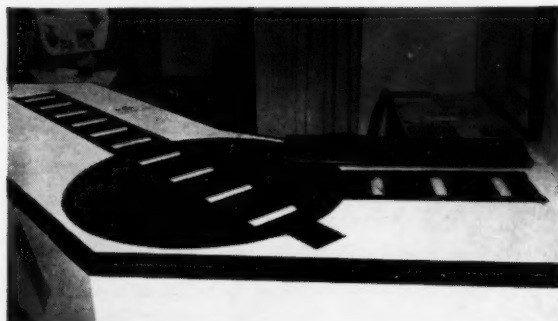
Conveyorized Screener

A mobile conveyor with integral vibrating screen was shown by E. P. Allam & Co., Ltd. The new machine is really a mobile conveyorized grader for quarry and similar equipment users. It is electrically driven and can be powered from the mains supply or an electric generator. The conveyor belt is of the semi-troughed type and it has integral V-ribs. The new machine is suitable for screening and grading duties which do not justify fixed installations, i.e. small runs at different points on large sites.

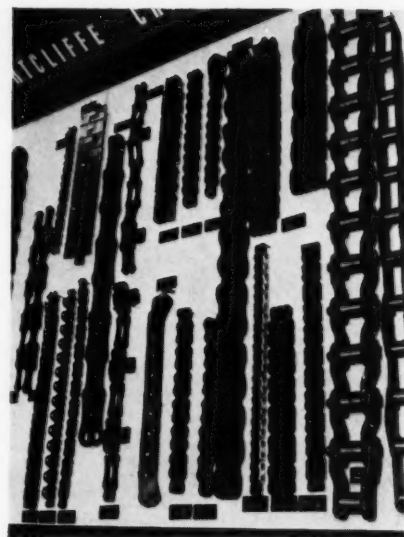
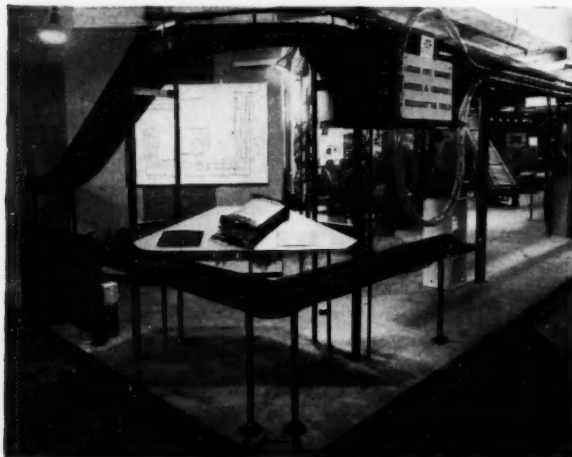
New and Improved Vibratory Conveyors

Of the large number of extremely well-designed vibrating conveyors and feeders shown at the exhibition it is possible to mention only about two or three. One interesting development was shown by Locker Industries, Ltd., their Ampitrol natural frequency feeder with pneumatic-control system. This was a packaged unit, designed to act as a hopper bottom with integral vibrating feeder.

PML roller conveyor shown by Promecon Manufacturing Co., Ltd.



90 deg bend section of a multi-lane V-trough conveyor for documents. Lamson Engineering Co., Ltd.



Specimens of Hartcliffe chains shown by The Morse Chain Division and Hartcliffe Chains Division (Borg-Warner, Ltd.)

A new development was shown by Thos. W. Ward, Ltd., their Ensign vibratory conveyor which is available in a range of widths and load capacities of up to 1,800 cu. ft./hr. It is claimed to be ideal for all bulk materials, especially those of a hot, gaseous, abrasive or toxic nature. The makers claim that dust-free conveying can be obtained and that materials at temperatures of up to 600 deg can be handled. The new machine can work at inclines of up to 18 deg depending upon the material handled. Speed of flow is about 60 ft/min and amplitude of vibration is ¼ in. The new vibratory conveyor is driven by English Electric motors and is available in troughed and tubular versions.

An unusually attractive exhibit was shown by Rownsons Conveyors, Ltd., a vibrating conveyor feeding on to a belt, the latter a development of the Rownsen Capacity U-belt. The vibrating conveyor was fed with a mixture of grain of two different sizes and colours. Segregation into upper and lower layers of different colours, due to vibration, was used to form two streams of grain of different colours, side by side, on the U-belt.

New and Improved Overhead Conveyors

Many long-established overhead conveyors have been further improved and their facilities extended. Splendid examples of modern practice were shown by such firms as George King and Teleflex, to name only two firms at random. Thus, the dual-duty storage conveyor system shown by Teleflex Products, Ltd., always attracted a number of visitors, as did the light version dual-duty system shown by Geo. W. King, Ltd., which was electronically controlled from an easy-to-comprehend master panel. Many firms are now taking an increased interest in overhead chain conveyors, and one well-known conveyor maker, T. & T. Worles, Ltd., is soon to commence making overhead chain conveyors. These machines will be of American design and will have 30-lb capacity load hangers.

Overhead Conveyor Simplification

Simplification and specialization of overhead conveyor design and construction were features of the new developments shown by Stewart Gill & Co., Ltd. One exhibit, the

(continued on page 417)

CONVEYORS—continued

Cleantrack overhead chain conveyor, was specially designed for the food industry and has a mild-steel galvanized tube as the hanger support rail. This simplifies construction and makes for robustness. The conveyor is designed to eliminate corrosion troubles and to permit easy, effective cleaning. Nylon rollers are used.

A second exhibit by the same firm was made by an associated firm, The Gerrard-Levering Co., Ltd. This was the new 5-D overhead chain conveyor, which employs standard bends, sections, and other parts and is designed to provide flexible and easily adapted layout arrangements. This machine is a choice of nylon, light alloy or cast rollers.

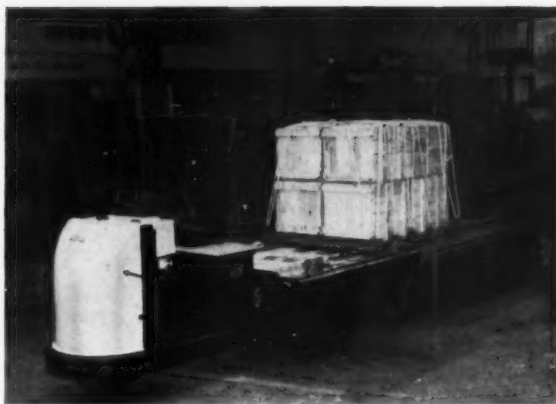
Another new development in overhead chain conveyor design was shown by Rownsons (Conveyors), Ltd. This was their Nylonk which employs nylon extruded blocks for the cruciform and nylon guide wheels which require no lubrication. The load wheels are of steel.

Rownsons are now part of the Baker Perkins Group, and on the stand another interesting innovation was shown. This was a Baker Perkins patented rope coupling on a Ropemaster circuit-type overhead conveyor of the type used in the garment industry. The new coupling is easy to fix and is said to be entirely trouble free, an important requirement in endless rope conveyors.

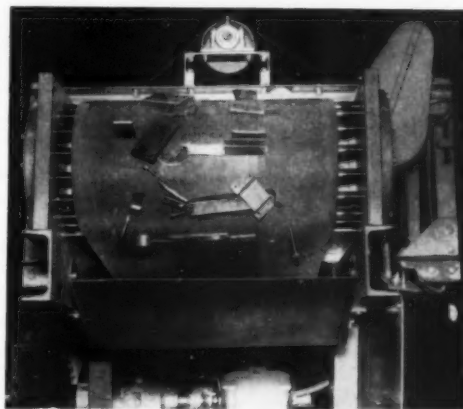
Complete Conveying Systems

A new complete-in-itself conveying system was shown by A. L. Marshall (Carlton), Ltd., the ALM Masterveyor Circulator conveying system, which was arranged in the form of an endless twin-circuit horizontal conveying-table system. The system employed two side-by-side conveying bands, one running in one direction, the other running in the opposite direction, with powered 180-deg turntable units at each end. Large work boxes travelled along the entire circuit and the theory of operation is that rows of operators at benches at right-angles take work boxes off as required, complete their work, and return the work boxes to the conveyor.

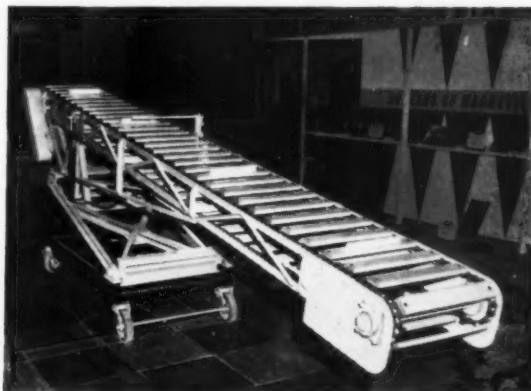
Another exhibitor showing complete conveying systems, J. Collis & Sons, Ltd., had a series of improved handling devices for use with well-known conveyors and elevators. Three of these were ball-bearing turntables. These were Transveyor tables, the largest with 3-in dia ball bearings, with a load capacity of 2,240 lb. Another new model in this series was a 750-lb model, with 1½-in balls. Also on show



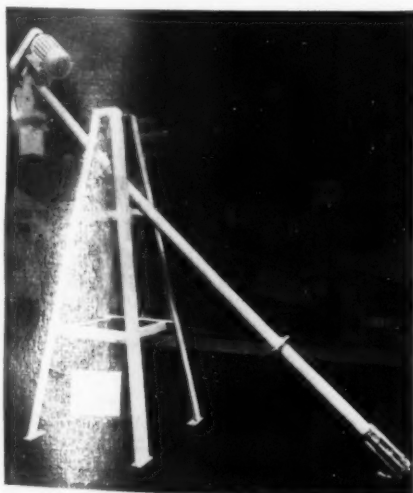
Armstrong Whitworth Rolamat roller conveyor cargo handling system accepting load from trucks. Brush Electrical Eng. Co.



Front view of tramp iron remover at work showing iron being held before discharge. Electromagnets, Ltd.



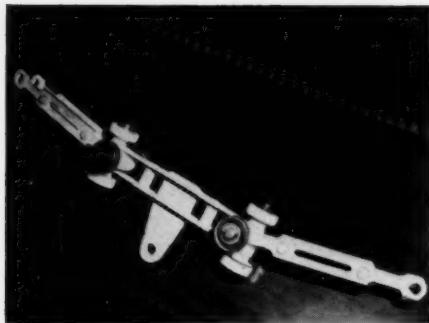
Gramac mobile slat conveyor on the stand of Grading Machinery, Ltd.



High-speed screw elevator. Bennis Combustion, Ltd.

was a 300-lb load-capacity model. These ball-bearing turntables are, of course, also widely used without conveyors, for example, for the maneuvering of sheet and plate steel in shipyards and rolling mills, etc., grids of turntable units being used to enable large and heavy sheets to be easily manhandled.

Four entirely new special-purpose handling equipments for use with complete conveyor systems were shown. These were the following: the Collis pneumatic Rolaveyor



Close-up of a section from the Nylolink overhead chain conveyor. Rownsons (Conveyors), Ltd

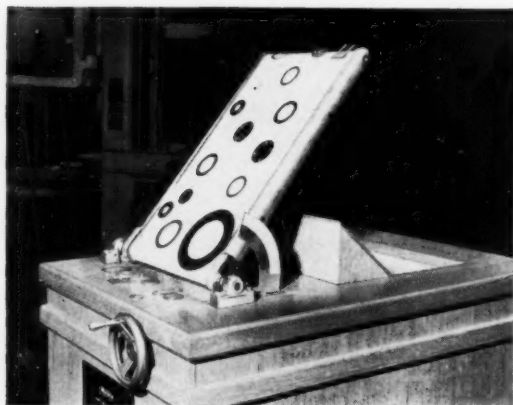
vertical lift section with 10 in lift or lift to suit individual requirements; the Collis rotary transfer unit with Transveyor ball assemblies; the Collis right-angle tipping transfer unit, pneumatically operated, with a metering device of the clamp-action type, fitted to the level section of a Motoveyor conveyor to control entry to the transfer unit; and the Collis pneumatic transfer unit with Transveyor assemblies.

Also on show were some forty different handling devices arranged in one comprehensive handling system, and a model of the S.S. *Canberra*, showing the Collis conveyor installation on board this modern ship. One exhibit, although not particularly new, is worth special mention because of its handling interest. This was the Collis accumulator-type conveyor, which was running at 30 ft/min and is designed to allow free and unrestricted travel of a conveyor under loads which are impeded in their progress for production reasons or because of an accumulator effect in order to cater for time lags in certain operations.

Adjustable Pressure Conveying System

A new type of conveying system was shown by Manufacturers Equipment Co., Ltd., the A.P.C. pressure-sensing conveyor, the initials standing for the words: adjustable pressure conveyor. The system consists of a roller wheel conveyor with power-driven centre belt. An inspector can hold up a line of cartons on the belt by finger-tip control. This slight pressure on a carton, etc., is sufficient to make pressure rollers rise and lift the carton off the belt until

Nylon and leather belt demonstration on the stand of Stephens Belting Co., Ltd.

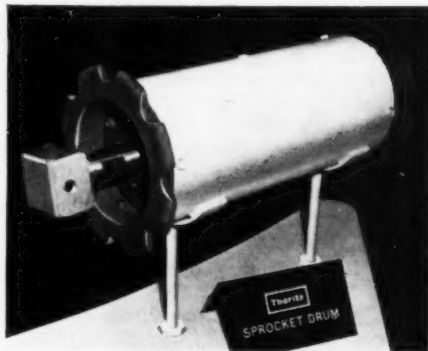


inspection is completed. This effect is transmitted back to other following cartons in contact with the one being inspected. The new conveying system enables automatic carton spacing to be carried out. It is available in units up to 200 ft. long.

Improved Screw and Flight Conveyors

A new high-speed screw elevator was shown by Dennis Combustion, Ltd. This was developed for the handling of boilerhouse small coal where a ground hopper or pit is not available. Capacity is up to $1\frac{1}{2}$ ton/hr. The elevator is self-cleaning and the bearings are lubricated for life.

A new flight conveyor was shown by W. S. Barton & Son, Ltd., the Superflo conveyor, a self-cleaning flight conveyor running in a half-round channel and suitable for the handling of finished commodities which must not be damaged during handling, e.g. dog biscuits, cattle cubes, etc. The new conveyor is not an alternative to screw conveyors but an alternative means of conveying for use when gentle agitation-free handling *en masse* is important, as well as self-cleaning. One important advantage of the new conveyor is the ability to follow one commodity by another immediately afterwards.



Thorite sprocket drum on the stand of Richards Structural Steel Co., Ltd.

Can Elevators

Can conveyors and elevators were shown by a number of firms. New machines were shown by Gardiner's Conveyors, Ltd., and by The Metal Box Co., Ltd.

The new Gardiner machine was a can elevator designed in conjunction with Batchelors Foods, Ltd. It was fitted with twin Super-Tanti belts for fast elevation and is suitable for feeding cookers, labelling machines, packing lines, etc.

High-pressure Pneumatic Handling

A new high-pressure pneumatic-handling system was shown by Thos. W. Ward, Ltd., their Fluid-Lift system which operates on small quantities of air in relation to the volume of material handled and uses a high operating pressure. The new system is designed for the gentle handling of a variety of materials ranging from flakes and powders, carbon black, and granular materials, to flour, grass seed, sugarbeet seed, iton powder, and gypsum, sugar, etc. An automatic safety valve can be fitted to disconnect the feeding lock in case of overload, re-connection being made when the

tubing is cleared. The Fluid-Lift pneumatic-handling system is made in Britain under Swedish patents.

New and Improved Idler Systems

New and improved belt-idler systems were shown by numerous firms. One new development of this type was shown by Hugh Wood & Co., Ltd., their Huwood Feather-bed idler. This uses a strong coiled spring mounted on bearings and provides a very high degree of resilience. It is designed to replace rubber cushion idlers and when used as an idler at loading points should help to greatly extend belt life.



New Ewart Chainbelt heavy-duty conveyor link, model No. 1605/AAA. Ewart Chainbelt Co., Ltd.

Another new development was shown by the Mining Engineering Co., Ltd., the Meco suspended idler belt conveyor structure, which is designed to provide resilient idler suspension. The exhibit showed idlers mounted in a section of support structure. Each idler had three rolls of standard Meco design, flexibly coupled together by chain links. Heavy spring assemblies within the side rolls, coupled to hooked bars, provided resilience. This system does away with cover plates, is easy to handle, and increases belt capacity under load as the idlers sink down accordingly.

Emergency Conveyor Switching

A new emergency conveyor switching system was exhibited by Hugh Wood & Co., Ltd., their Huwood concentric cable signalling system, an emergency trip-wire arrangement. The main advantages of this system are as follows: a conveyor can be instantly stopped at any point along its length without requiring an operator to react to a warning bell, the conveyor stops in the case of current failure or short circuit within the system. A concentric cable alongside the conveyor is used and this is always in circuit. Spring-loaded switches at suitable intervals are operated by trip wire. Conveyor tripping is by breaking the circuit, not making it.

Document Handling System

A new document-handling conveyor was shown by Lamsa Engineering Co., Ltd., their V-trough conveyor, available in single- or multi-lane versions. The new conveying system incorporates a 90-deg turn unit and conveys documents on edge by narrow friction belts. Each lane can be used for a different document, a different processing



A demonstration conveyor belt unit showing resistance to abrasion. British Nylon Spinners, Ltd.



Vibro insulators shown by B.T.R. Industries, Ltd.

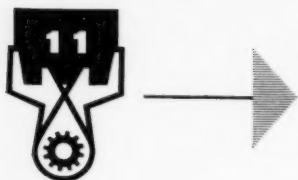
or direction. Running costs are low, as a fractional h.p. electric motor is sufficient for a whole installation.

Bulk Materials Inloader

An enclosed dustless bulk materials unloader was shown in working model form by International Combustion, Ltd., a self-cleaning installation for the unloading of coal from ships and barges. It is designed to move up and down according to the state of the tide and consists of a self-contained machine comprising a bucket elevator mounted on a hinged boom with specially designed unloading buckets. Output is 150 ton/hr for coal and other loose materials.

Stockpile Conveyor and Spreader

A new type of stockpile conveyor and spreader was shown in working model form by the Mining Engineering Co., Ltd., the Meco belt-conveyor telescopic and radial spreader. The new machine is designed to follow the building up of a soil tip in adjustable steps and permits rapid conveyor advance, in steps of up to 30 ft.



ANCILLARY AND OTHER EQUIPMENT

As will be appreciated, the quantity and variety of equipment displayed by over 300 exhibitors and which could be classified under this heading was very considerable indeed. Gears and associated equipment for example were to be seen on the stands of no less than 22 exhibitors.

Many items will be found dealt with in other sections of this review because they are closely associated with the equipment mentioned in the headings. Exhibits dealt with in the following therefore have been selected as typical for inclusion under this concluding section, 'Ancillary and Other Equipment'.

An interesting demonstration showed how Cordey-Thomson mitre gears can be adapted into new machinery designs giving totally enclosed shaft drives. The complete range of accessories were connected by short torque tubes and cover tubes to give synchronized drive at eight separate points. The range is suitable for ratings from 1 h.p. up to 3 h.p.

A new range of right-angled change-of-direction bevel units known as the 'Anglegear' was shown by Varatio Strateline Gears, Ltd. This range covers from $\frac{1}{2}$ to 5 h.p. at 1:1 and 2:1 ratios.

Two new power units were among the range of Perkins diesel engines. The new 5-litre 6-cylinder industrial diesel named the SIX 305(1) is rated up to 87 b.h.p. at 2,400 r.p.m. for intermittent use. The other new unit was the 60-h.p. Perkins FOUR 203 industrial engine which is suitable for many different types of industrial applications.

Engines made by the Ford Motor Co., Ltd., were to be seen on two stands. On one stand was displayed industrial engines in a range from a 3-cylinder diesel developing

28.2 b.h.p. up to a 6-cylinder diesel developing 86.5 b.h.p. On the other stand Fordson Power Major equipment units were on show with 4-cylinder diesel engines developing 51.8 h.p. These units are available in more than 120 variations of build.

Torque converters and power shift transmissions were featured on the stand of Brockhouse Engineering, Ltd. Shown for the first time was a Fordson Power Major tractor fitted with torque converter and power shift transmission, a Perkins FOUR/99 diesel with similar equipment, a Perkins 270D engine with torque converter and disconnect clutch and a Dorman 3LB engine with torque converter and power shift transmission.

Wheels and castors with load-bearing capacities of up to 6 tons were seen on the stand of Autoset (Production), Ltd.

Industrial wheels of the cushion tyred, hard moulded and other types were shown by Compressed Rubber Products, Ltd. This company also included heavy-duty wheels and trailer wheels and light, heavy and medium duty castors.

Under-gear equipment for trailers and other applications covering axle loads from 2 cwt up to 2 tons were displayed by Rubber Products (Warwickshire), Ltd. Many other types of axles, wheels and tyres were shown, the axles being made to specification with or without brakes, and to any track measurement, with tyres and wheels to requirements.

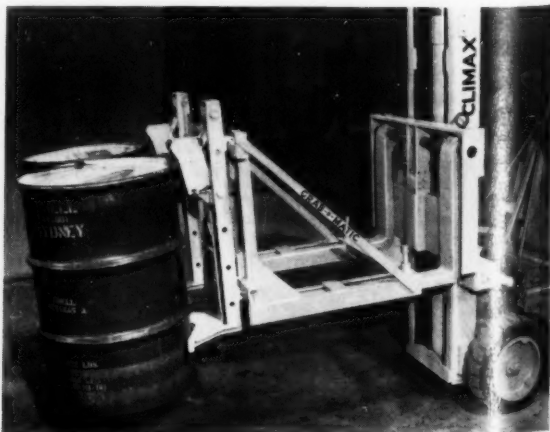
The Wagener Barrow Hepburn & Gale vulcanizing units are suitable for both p.v.c. and rubber conveyor belt jointing and repairing. Constructed in steel or light alloy they are particularly strong and light in weight and the heating elements are so built into the units as to ensure even

(continued on page 421)

On the stand of Midland Bank, Ltd., machines for counting bank-notes and coins were shown. This picture shows one of the coin counting machines. Midland Bank, Ltd.



The 'Grab-O-Matic' equipment for high stacking without pallets. St. Clare Engineering Co., Ltd.



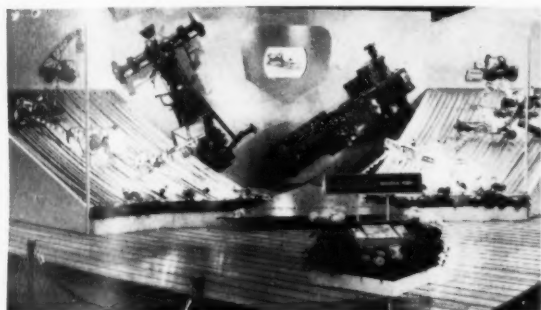
ANCILLARY AND OTHER EQUIPMENT—continued

temperature over the entire platen surface. A small repair press which has been designed for extreme portability was also shown. One man can easily handle this unit in the most restricted space.

The Unimaster dust control unit, shown by Dallow Lambert & Co., Ltd., for the first time, is a self-contained collector available in several capacities. The Unimaster can be supplied with a variation of fans and motors, filters and dust containers, and it is claimed that applications requiring a large volume but producing little dust can be dealt with as effectively as those in which the air requirement is small and the load heavy. Light bulky dusts can be handled as easily as heavy concentrated dusts.

Among the display of equipment for drawing offices by Dargue Brothers, Ltd., was seen the hydraulic 3D Hydrolift drafting stand which allows the drawing board to be moved in three planes by means of pedal controls and a central lever. Another new development by this company is a filing cabinet for vertically hung drawings.

Roball Engineering Co., Ltd., who were showing at the exhibition for the first time, featured a new range of ball-bearing turntables for trailers, industrial trucks and runabouts. Spring-damped versions are available for hand-drawn or pedestrian-steered vehicles. The larger sizes of these turntables are suitable for up to 6 tons payload.

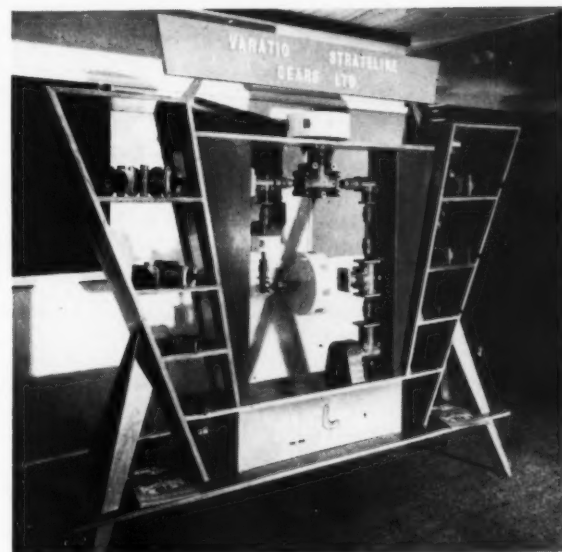


ABOVE
Fordson Power Major equipment units with 4-cyl diesel engines, are available in over 120 variations of build. Ford Motor Co., Ltd.

TOP RIGHT
Chains and associated equipment. Wheway, Watson & McLean, Ltd.

RIGHT
Demonstration of the new 'Anglgear' bevel gear units. Varatio-Strateline Gears, Ltd.

BELOW
Perkins industrial engines shown in a range from 33 b.h.p. up to 69 b.h.p. continuous rating. Perkins Engines, Ltd.



The Priestman Cross-Roll bearing shown by Priestman Bros., Ltd., has been designed and manufactured in collaboration with British Timken. This bearing is a totally new design of slewing ring for heavy duty and requires little, if any, attention. It is now the standard slewing ring on the Priestman Cub and Tiger excavators and grab dredging cranes, and is in use on other diverse applications, such as radar scanners, wind-tunnel turntables, overhead gantry cranes as well as a variety of mobile and truck-mounted cranes. Two examples of this bearing are shown in our front-cover picture.

The development and improvement of the sealing system incorporated in the self-lube bearings made by Pollard Bearings, Ltd., was demonstrated by means of a test rig in which a number of self-lube units operated in simulated desert sand-storm conditions. A second test demonstrated various applications of the range including the taking up of



One section of the Priestman stand was devoted to a selection of excavating grabs. Priestman, Bros. Ltd.

slight shaft mis-alignment. These bearings can be supplied to suit shaft sizes from $\frac{1}{2}$ to 6 in dia in many types.

F'Ag Bearing Co., Ltd., who claim to be the founders of the ball and roller bearing industry in Europe, demonstrated the new Lubriseal range of plummer blocks and flange units.

Among several exhibitors showing weighing machines was seen the Electromatic made by S. Parsons & Co., Ltd. The demonstration shows how weigh dials can be fitted with mechanical or electro-mechanical cut-off devices automatically to control the flow of free-flowing materials for straight discharge, or proportional mixing. An accuracy within half a division is claimed and up to eight control switches can be fitted.

Murphy Radio, Ltd., demonstrated the Transweigh system for weighing belt-conveyed solids. This is a system for continuously weighing and controlling free-flowing solids, and was shown for the first time in Europe. It employs a weighing carriage, a load cell for sensing the material weight on the belt, a Selsyn transmitter and the Transweigh integrating meter which accurately and remotely indicates the rate and totalized weight of the conveyed material.

Richardson Scale Co., Ltd., included several types of automatic scales including a complete range of constant-weight feeder machines.

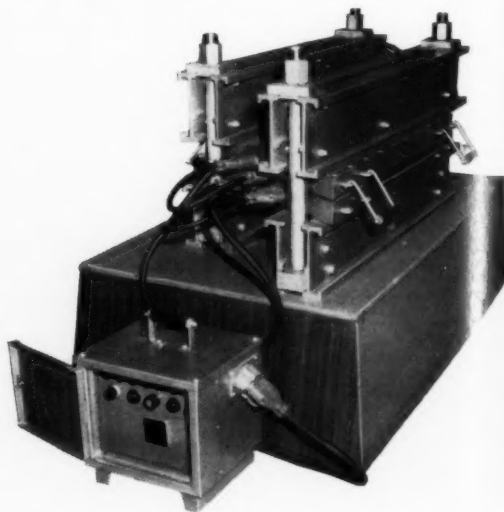
Merrick Scale Mnf. Co., Ltd., included their Weightometer which is a mechanical integrator continuously multiplying two varying quantities which are, first, the ever varying load on the conveyor, and second, the slightly varying belt speed of the conveyor. All types of instrumentation can be supplied with this machine, both electronic and pneumatic.

The powder pumping division of Mono Pumps, Ltd., displayed the new Junior powder pump. This is a compact unit designed for the small batch transfer of powder and can be applied as a device for dosing or blending powders or

for bleeding off small quantities of powders from draw-off points in a powder handling system. The rate of discharge from this new pump can be varied up to a maximum of approximately 5 cu. ft. of powder per hour.

A composite exhibit demonstrated the application of various types of magnetic equipment on the stand of Electromagnets, Ltd. This exhibit, which consisted of four sections, showed: 1, an inclined conveyor embodying a Boxmag magnetic conveyor head unit; 2, a high-intensity overband-type magnetic separator fitted over the inclined

A portable vulcanizing unit from the range of conveyor belt repair equipment shown by Barrow Hepburn & Gale, Ltd.



conveyor; 3, magnetic clutches fitted between the motor and the conveyor driving gear box; 4, an example of a vibratory feeder to feed material to an inclined conveyor. This vibrating feeder was made by Blended Machine Co., Ltd., an associated company of Electromagnets, Ltd.

Every day more than £12 million in cash is passed across the counters of 2,500 branches of the Midland Bank, Ltd. In what is believed to be the first display of its kind by a British bank, the Midland on their stand at the Exhibition demonstrated three types of machines used to assist its staff in handling this vast quantity of cash. One machine showed how bank notes are counted, at a speed of more than 20,000 an hour, and two other machines demonstrated the counting and sorting of coins. One of these was capable of sorting more than £1,000 in mixed silver coins every hour.

Revolutionary manufacturers of graphited lubricants, included their new Reductol which is a super-film strength graphited lubricant for enclosed gear units. Voller graphited grease which includes MoS₂ is also a new product.

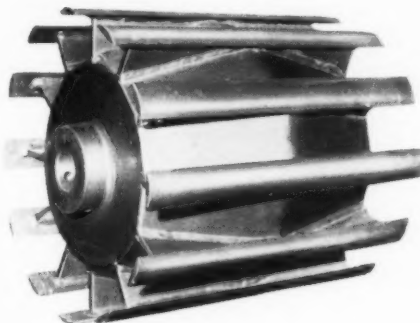
Loading and Unloading Equipment

Under this heading a very large number of the exhibits at Earls Court could, of course, be included, but in this report only equipment specifically designed for loading road transport is included.

There were a number of cranes designed for mounting on lorries without unduly encroaching on the load area. The heaviest on view was the 2-ton model of the Hiab Major hydraulic lorry loader, marketed by George Cohen Sons & Co., Ltd. This is a most impressive piece of equipment. The jib assembly is pivoted to the top of the main pillar and is raised and lowered by means of a 5-in. ram. The jib



Ingold-Compactus heavy-duty storage equipment. J. Glover & Sons, Ltd.



ABOVE

The 'Beltsaver' welded conveyor pulley. Crofts (Engineers), Ltd.

LEFT

An exhibit illustrating the use of Cordey-Thomson Mitre gears. Cordey-Thomson.

BELOW

Tailboard loader shown by Service Engineering Co. (Northampton), Ltd.

Simplabelt infinitely variable speed pulley. The Northern Manufacturing Co., Ltd.



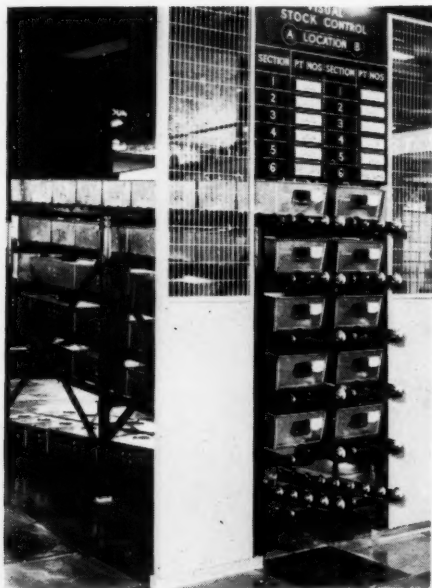
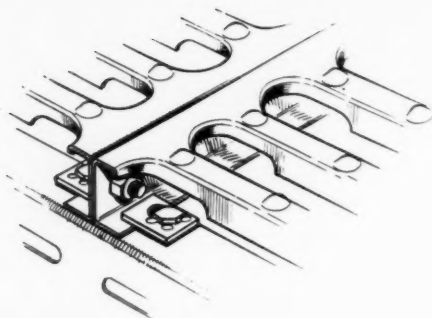


ABOVE LEFT
The Hiab lorry-loader of 3 ton capacity. (George Cohen, Sons & Co., Ltd.)

ABOVE
Hydraulic hoist for lorry mounting, capacity 2½ cwt. (Epcor, Ltd.)

LEFT
Sketch showing method of securing Dexion metal planking. Dexion, Ltd.

BELOW LEFT
A visual stock control system shown by Rubery Owen & Co., Ltd.



is further pivoted at its centre point, a second ram controlling this hinge, thereby controlling the operating radius. The end section of the jib carries a telescopic extension allowing the jib length to be further increased by stages up to a maximum of 13 ft. Slewing is by power through 180 deg.

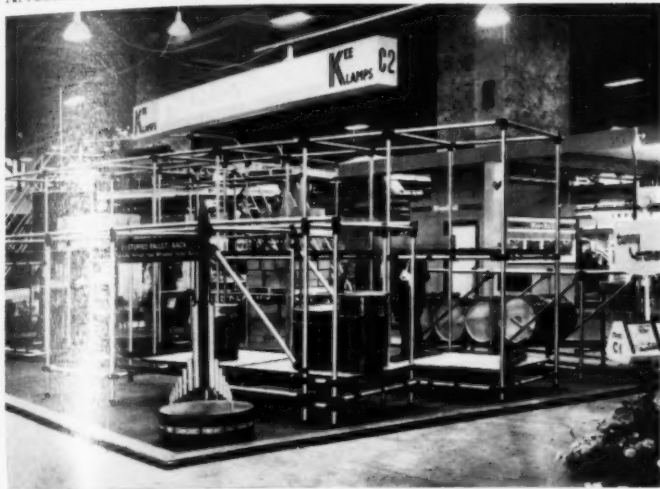
Hydraulic power is supplied by a multi-cylinder piston-type pump driven by a p.t.o. on the vehicle's transmission. The hydraulic reservoir is built-in as an integral part of the pillar base. Dual control positions are fitted on both sides of the vehicle. Two levers control all motions, one operating the main jib ram and the power traverse, the other the secondary ram.

The capacity of this model varies from 2 tons at 5-ft operating radius to 15 cwt at 13-ft radius. The lift height is from 7 ft below ground level to 20 ft above.

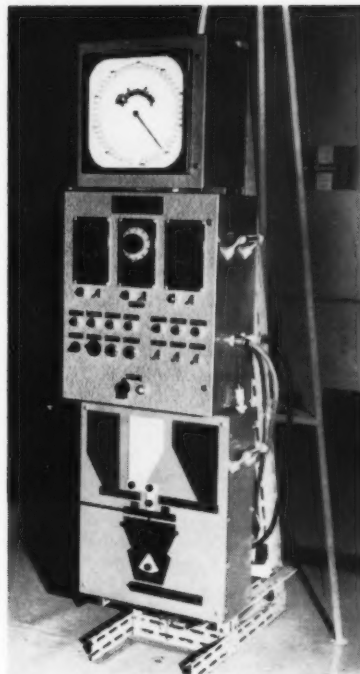
The Hiab Major is mounted as a single unit on the main chassis of the vehicle and requires a space of 15 in between the cab and the vehicle body. A remarkable feature is the easy manner in which the jib can be folded away completely for travelling. In the model on view this operation is done partly by hydraulics and partly by hand; in later models folding will be fully hydraulically operated.

A second Hiab lorry loader, the 1-ton 'Bimbo', was also shown. The jib of this is similar in most respects to that of the Hiab Major except that only one ram is contained within it. There is another ram in the main pillar which controls the major part of the raising and lowering operation. The capacity of the Hiab 'Bimbo' ranges from 1 ton at 5-ft radius to 9 cwt at 11-ft 6-in radius. Slewing is fully hydraulic through 180 deg; as an extra

(Continued on page 425)



Pallet racks and other types of Kee Klamp storage equipment. Geo. H. Gascoigne Co., Ltd.



ABOVE
The Richardson automatic Selectoweigh. Richardson Scale Co., Ltd.

BELOW
Example of a spring-operated cable reeling drum. W. E. Burnand & Son, Ltd.

BOTTOM
The Springback industrial hose for vacuum or pressure duty. BTR Industries, Ltd.

359-deg slewing is available. Folding in and out of the travelling position is fully hydraulic. The 'Bimbo' can be mounted on a tractor; the model demonstrated at the Exhibition was on a Fordson tractor, a combination which is marketed by Geo. Cohen.

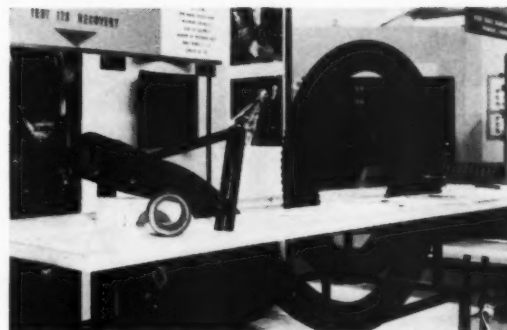
At the other end of the price scale of lorry loaders is the Epcro dual-purpose hydraulic crane, made by Epcro, Ltd., in 2/5-cwt and 10/20-cwt capacities. The dual-purpose label arises from the fact that the same crane, without adaptation, can be used either on a stand for general workshop use, on a lorry, or at the side of a loading bay, simply by lifting the crane and dropping it into a socket. Thus a fleet of lorries on mixed transport work can be fitted with sockets and an Epcro crane taken on a journey only when the type of load necessitates the use of one.

For lorry use, the Epcro crane is mounted at the tail-board end. The mounting socket can be laid flush so that the floor area is in no way affected. The boom is telescopic and is raised and lowered by a hydraulic ram actuated by a rugged two-stroke hand pump. Slewing is by hand. Lift capacities are as follows: 2/5-cwt model, 5 cwt at 35-in radius to 2 cwt at 58-in radius; 10/20-cwt model; 20 cwt at 35-in radius to 10 cwt at 58-in radius.

Another lorry crane seen at the Exhibition was the Stanhay hydraulic loader. This equipment can be mounted behind the driver's cab on most commercial vehicles and can be used as a hoist for barrels, sacks and cases, or it can be fitted with a grab for loose materials like lime, ballast, coal or grain. A fork-type grab is available for farmyard manure.

The jib is slewed manually and operates through a full half-circle clear of the side of the vehicle and completely over the body. A recommended method of slewing the grab is to incline the lorry slightly away from the material being loaded so that the grab swings by gravity to the discharge point. It can then be pulled back empty by a rope and guided down for the next load. The jib is non-telescopic and is supplied in a length suitable for the lorry to which the crane is fitted. It is raised and lowered by a hydraulic ram, power being supplied by a gear-type pump p.t.o. driven from the vehicle's gearbox.

The lifting capacity of the Stanhay loader varies according to the length of the jib fitted, but loads up to 10 cwt can be handled easily and safely. With a 7-ft 4-in jib the loader fitted with a grab will operate from ground level and discharge at a height of over 8 ft. The capacity of the hydraulic-





In addition to conveyors of different types International Combustion Products, Ltd., displayed many other items including screens as shown here. Electric vibratory equipment was also shown by Riley (IC) Products, Ltd., on the same stand

ally-operated grab is $5\frac{1}{2}$ cu. ft.; the average grab load is 5 cwt.

A complete cycle of operations, i.e. grab, lift, slew, discharge and return for the next load takes approximately 25-30 seconds, giving a loading capacity of 1 ton every two minutes. As a hoist for cases, etc., the time is reduced to 8-10 seconds. The Stanhay loader is controlled from the side of the vehicle.

The Vertiswing, a new tail-board loader for open lorries, was introduced at the Exhibition by Service Engineering Co. (Northampton), Ltd. This, with $12\frac{1}{2}$ cwt capacity, is

the heavyweight of equipment of its type. An even larger model, capable of taking ton loads, will be available shortly.

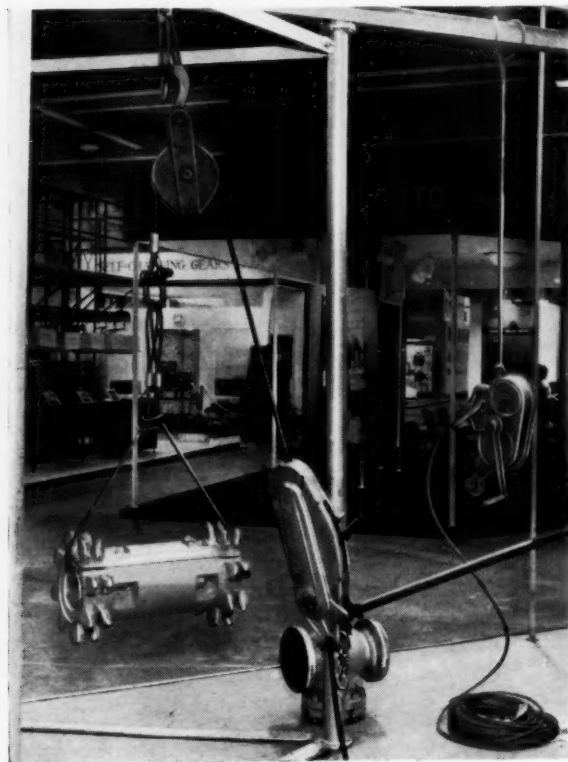
The Vertiswing consists of a robust platform, almost the width of the lorry floor, lifted by two arms of rectangular tube steel. These arms are connected with a strong torque tube to ensure perfect alignment throughout the platform's travel. At ground level the platform is some 3 ft distant from the end of the lorry. Not only does this allow greater accessibility but it enables loads to overlap the platform. Power is supplied via a p.t.o. through a hydraulic pump to two hydraulic rams which are housed within the framework. Thus the rams are well protected and all stresses are contained within the unit and not transmitted to the vehicle. Lifting operations are controlled by a hydraulic valve with built-in pressure relief. This valve can be positioned on the lorry wherever required.

The 20-cwt Vertiswing is of similar design and incorporates jacks to support the near end of the lorry when in use. Service Engineering Co. (Northampton), Ltd., also introduced a hydraulically-operated tail-board loader for large vans and pantechnicons. This has a platform lift of up to 8 ft with a load capacity of 5 cwt, and has been developed for handling washing machines, refrigerators, cookers, etc., too heavy to be lifted by one man which need to be carefully loaded and stacked in tiers.

The loaders previously described are all for installation in vehicles or are transportable. The new Lodlifta exhibited by Laycock Engineering Co., Ltd., is a static unit designed for installation in a loading bay. Basically, it is a platform rising and falling between four corner posts.

The Lodlifta is available in various sizes; type 88, which has a platform 8 ft square, was shown at Earls Court. It is electrically operated, a 3-h.p. motor being installed at one corner of the platform. This, via reduction gearing drives an endless chain which motivates the screw lifts in each of the corner posts. Push-button switchgear controls the operation of the platform which is automatically stopped at the upper and lower limits by cut-out trips. The platform can be stopped at any height up to the full travel, which on standard models is 4 ft $8\frac{1}{2}$ in above the floor. Locking is automatic; sprags or similar safety devices are not necessary. The raised platform is perfectly rigid and allows easy off-loading at higher levels without any movement of the platform whatever.

The lowered height of the platform is under 6 in. thus the pit required to bring the platform to floor level is very shallow. The safe working load of standard Lodliftas is 3 tons, but special equipment can be supplied with capacities of up to 12 tons.



Tirfor new-type pulling and lifting machines, T.35 centre and Sky Scraper scaffold winch right. Tirfor, Ltd.

Models on Show

A GREAT deal of plant and equipment manufactured by exhibitors was either so big or complicated that it could not be accommodated either on a stand or among the outside exhibits at the Exhibition. To overcome this, models, most of them working, were used to a considerable extent for the purpose of giving 'scaled down' demonstrations. So high was the standard of workmanship and ingenuity shown in the construction of most of these models that it was considered worthy of record. Typical examples are therefore shown in these pages.

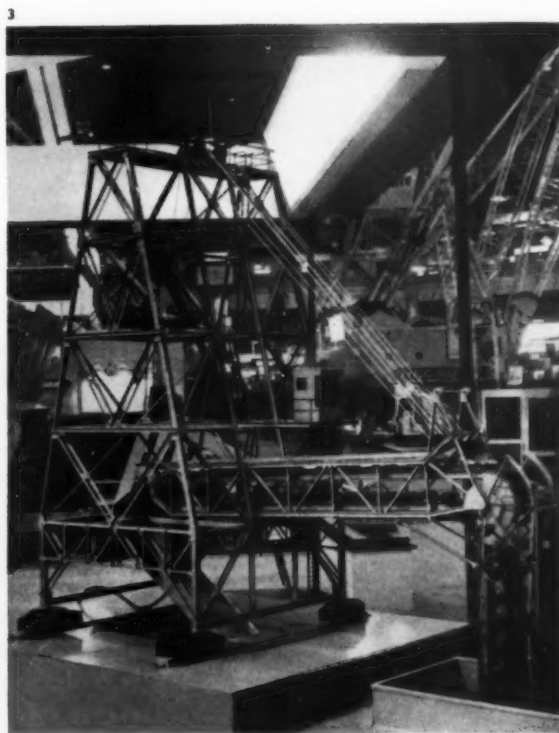
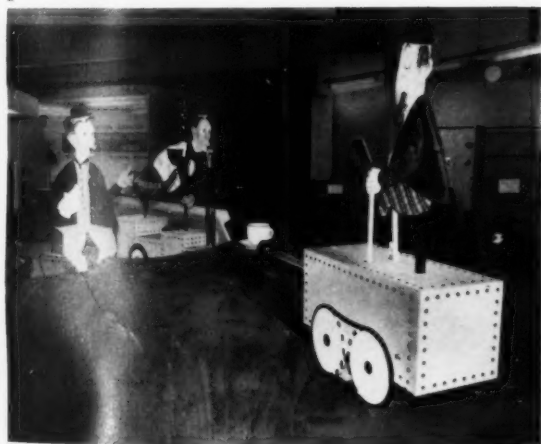


Fig. 1. Scaled scale working model of a Sheepbridge gyratory crusher. Sheepbridge Equipment, Ltd.

Fig. 2. Humour was not absent! This amusing model of mechanized tea-serving formed part of the display for W. J. & Pollock, Ltd.

Fig. 3. Working model of an unloader for bulk materials. International Combustion Products, Ltd.

Fig. 4. The Anderson Clyde Overlord 4-motor overhead travelling crane



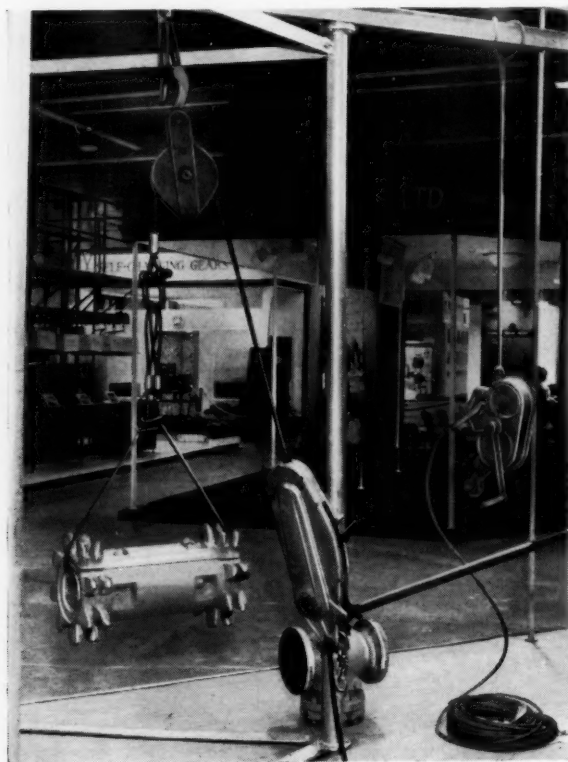
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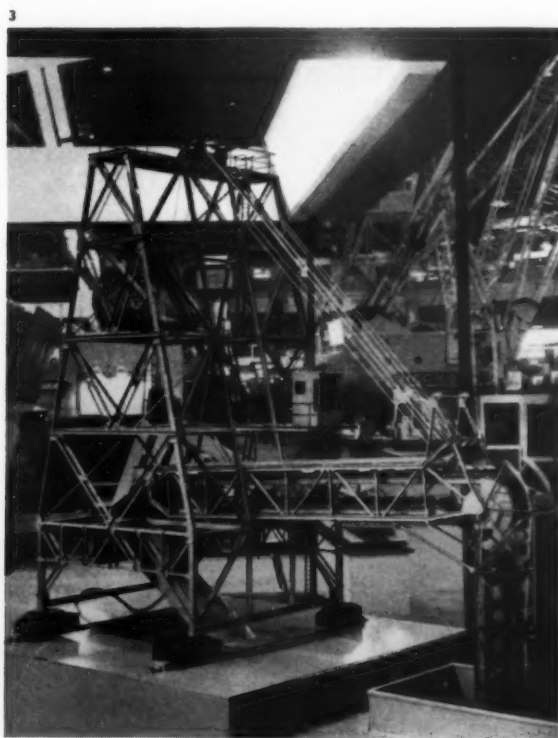
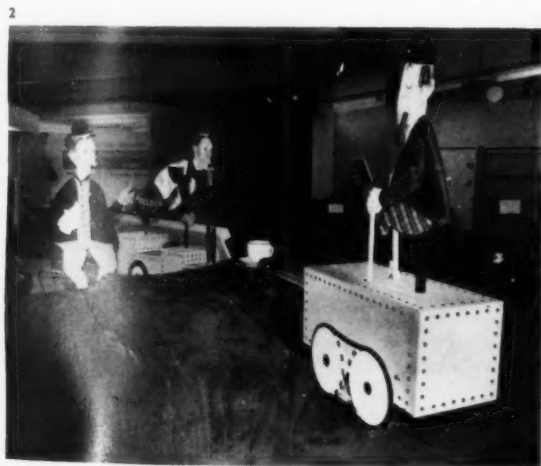
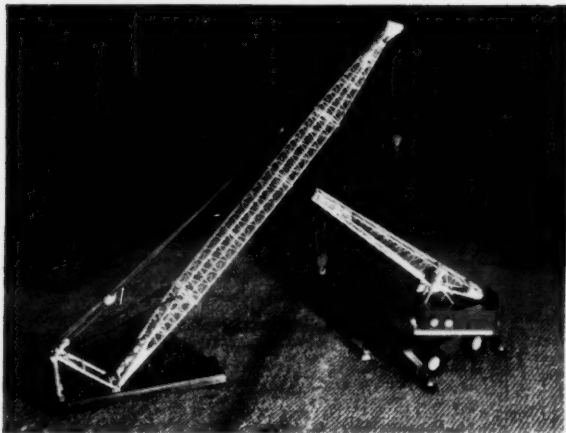


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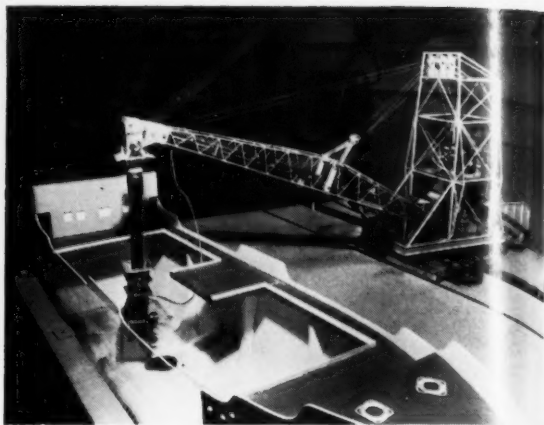
Fig. 3. Working model of an unloader for bulk materials. International Combustion Products, Ltd.

Fig. 4. The Anderston Clyde Overlord 4-motor overhead travelling crane



MODELS ON SHOW—Continued

6



7

Fig. 5. A static model of the new Ransomes 1520 mobile crane right, and a 70-ft strut jib for the same, left

Fig. 6. Working model of a bulk cargo loader, Crone & Taylor (Engineering), Ltd.

Fig. 7. A 15-ton 5-motor electric travelling monotower crane with a 127-ft 6-in jib. The model is shown against a photographic background of a shipyard. Butters Bros. & Co., Ltd.

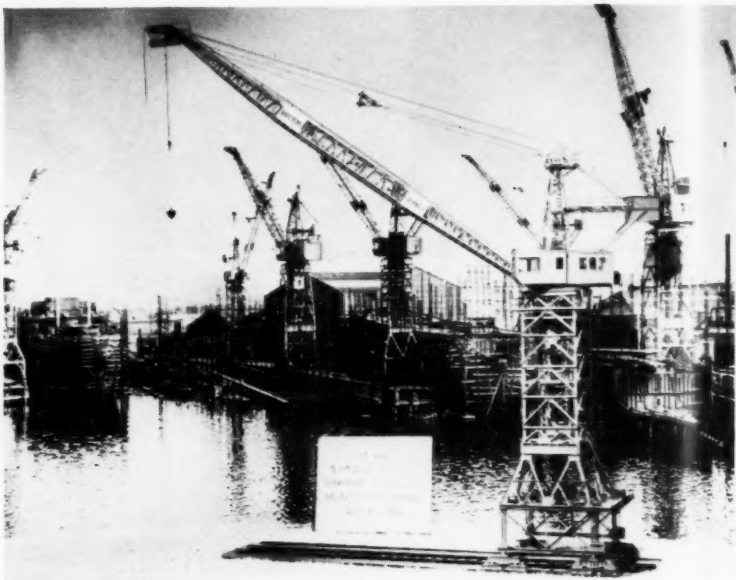


Fig. 8. This comprehensive working model demonstrated the loading of aircraft by the use of the Armstrong Whitworth Rolamat roller conveyor. Brush Electrical Engineering Co., Ltd.

8



MODELS ON SHOW—continued

Fig. 9. This large model of the Canberra was on the stand of J. Collis & Sons, Ltd. By dialling the number of any compartment shown on the diagram, a description in one of three languages could be obtained on the earphones



Fig. 10. Clarke Chapman 3-ton electric level-luffing crane shown by Priestman Bros.

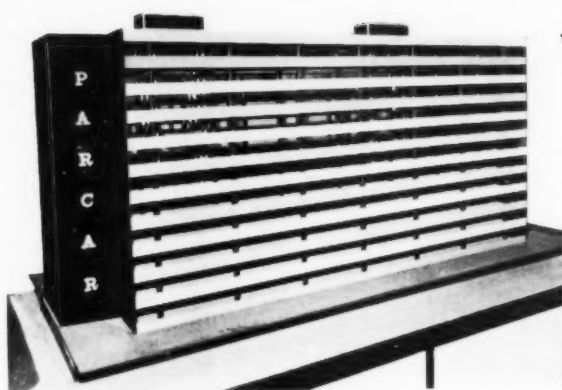


Fig. 11. Model of a typical 'Parcar' mechanical car park. Mitchell Engineering, Ltd.

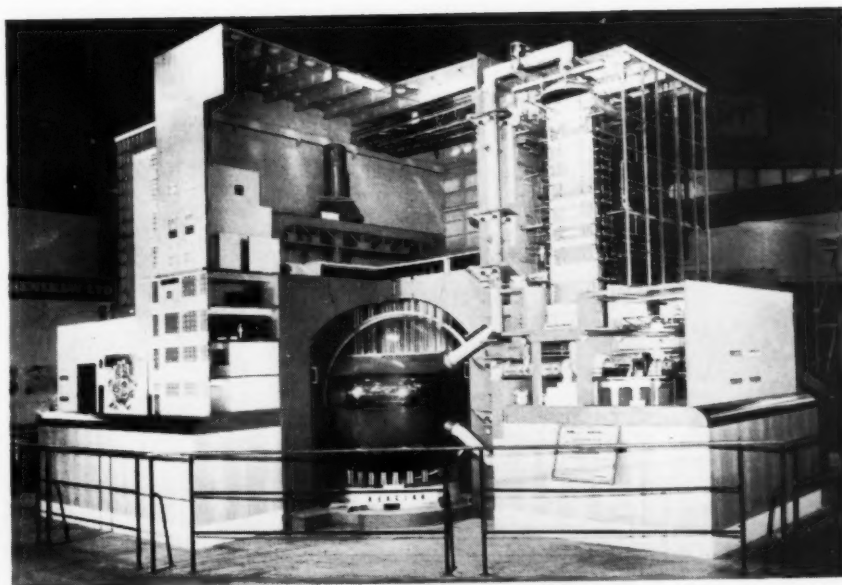


Fig. 12. This remarkable model dominated the stand of Strachan & Henshaw, Ltd. It shows in section one of the reactors for the Bradwell Nuclear Power Station for which this firm are supplying the equipment for handling the uranium fuel and for charging and discharging the reactor



Among the Visitors

The reception desk and lounge for official visitors

AMONG the many visitors to the Exhibition were a number of organized groups and official visits. A few of these are shown on this page, together with an indication of some of the facilities provided for visitors.

To give a complete list of the official visits made is impossible, owing to the limitations of space, but amongst the distinguished visitors were Mr. D. MacDougald, Chief Executive of the British Institute of Management; Mr. C. Remfry, Immediate Past National Chairman and Mr. H. M. C. Harwood, Secretary of the Institute of Materials Handling; Mr. T. C. Battersby, M.B.E., of the Institution of Gas Engineers; Mr. G. R. Pryor of the Institution of Production Engineers with Mr. W. F. S. Woodford, Secretary of that Institution; and Lord Gretton, President of the Institute of Brewing, with Mr. G. E. Sanders, Secretary of that Institute.



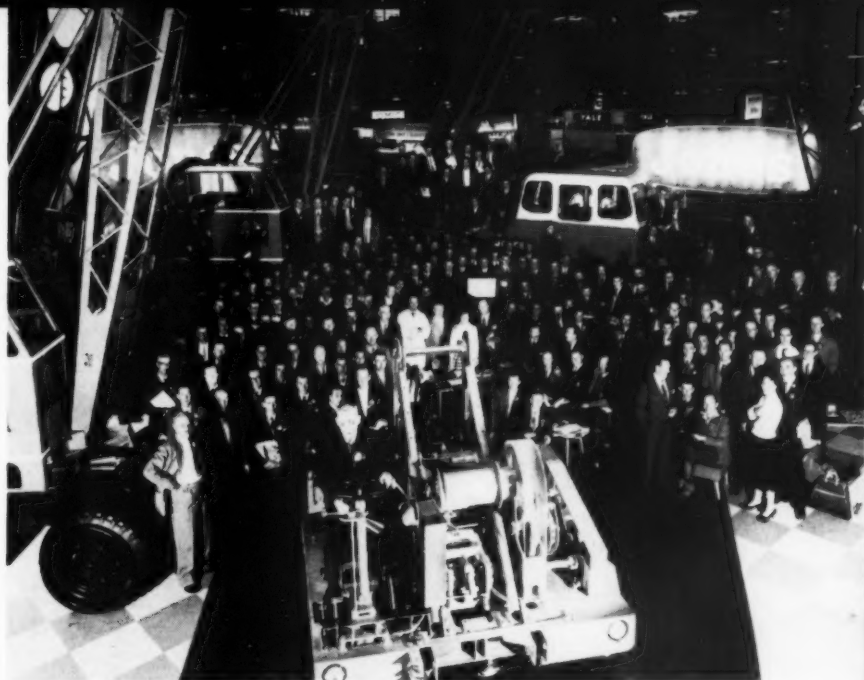
Seven interpreters dealt with some 200 foreign buyers a day in the Overseas Visitors lounge, which was built in the form of a space ship, the circular shape of the structure allowing ample seating and standing space together with easy access to and from the main exhibition area. This shows the interior of the lounge with three visitors from Russia

The Materials Handling Group of the Institution of Production Engineers. Left to right, Mr. Gwynne of Underwood; Mr. P. H. Steer of C.V.A.; Mr. Soane, Lambretta Concessionaires; Mr. Holt, Metropolitan Boroughs Committee; Mr. Loris, Mobiloil; Mr. Cook, Thames Board; Mr. Woodford, Secretary, Institution of Production Engineers; Mr. Pryor, President of Institution of Production Engineers, and Mr. L. Bailey, Chairman, Materials Handling Group



Members of a party of 16 businessmen from Japan

→
At the invitation of George Cohen Sons & Co., Ltd., over 230 members of the Jones Cranes Drivers' Club visited the Exhibition



↓
This shows the interior of the press office and indicates the extent of the advance press coverage given to the Exhibition and organized by Mr. Derek Page, Press Officer, who appears in the picture



A party of French businessmen representing the motor, textile and other important industries. This visit was organized by the Centre d'Information de la Manutention

Sixteen Regular Officers of the Royal Electrical and Mechanical Engineers from the R.E.M.E. Training Centre, Bordon



Supporting Associations

Aerial Ropeways Association



The following photographs are of members of the Management Committees of the supporting Trade Associations to the Mechanical Handling Exhibition.

Mechanical Handling Engineers Association

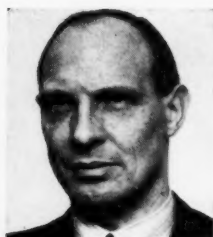
W. G. Picton—President (International Combustion Products, Ltd.)



H. F. Shields,
O.B.E. — President



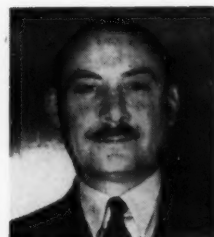
W. Morland Fox—Vice-President (W. J. Jenkins & Co., Ltd.)



I. Hey — immediate Past President (Simon Handling Engineers, Ltd.)



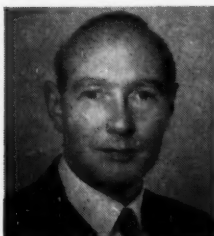
C. W. Allin (Redler Conveyors, Ltd.)



L. Brook (Simon-Carves)



L. A. Collis (J. Collis & Sons, Ltd.)



H. G. Harwood (Hugh Wood & Co., Ltd.)



D. Jackson (Mavor & Coulson, Ltd.)



J. F. R. Mitchell (Mitchell Engineering, Ltd.)



Lt.-Col. E. Ward (Strachan & Henshaw, Ltd.)



F. S. Stent (Babcock & Wilcox, Ltd.)



The Association of Crane Makers

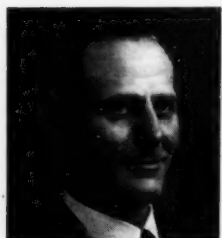
B. Butters — President (Butters Bros. & Co., Ltd.)



P. M. Rambaut (Cowans Sheldon & Co., Ltd.)



J. Gourlay (Stothert & Pitt, Ltd.)



S. W. Heywood (S. H. Heywood & Co., Ltd.)



A. Hallsworth (Steels Engineering Products, Ltd.)



W. Reside (William Arrol & Co., Ltd.)

Shields,
President

is (J.
Sons,

(Bab-
Wilcox.

William
(Ltd.)

1960

C. S. ... & L.
Steel ... &
Engine...

John Baker (Joseph Booth
& Bros.)

G. V. Sadler (The Vaughan
Crane Co., Ltd.)

N. A. Jenkinson (Babcock
& Wilcox, Ltd.)

W. H. Sharp (Thomas Smith
& Sons (Rodley) Ltd.)

**British
Industrial
Truck
Association**



J. R. Sharp — Chairman
(Lansing Bagnall, Ltd.)



L. Rumley (Conveyancer
Fork Trucks, Ltd.)



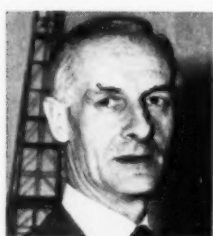
R. P. Lister (Coventry
Climax Engines, Ltd.)



B. A. Christie (I.T.D.,
Ltd.)



L. S. Mathew
(Mathbro, Ltd.)



H. P. McClean (Ransomes
& Rapier, Ltd.)



C. P. Seagar (Ransomes
Sims & Jefferies, Ltd.)



R. Jefferies (Wingrove &
Rogers, Ltd.)



W. A. Galbraith (The Yale &
Towne Manufacturing Co.)

**Association
of Lifting
Tackle
Makers**



L. J. Tichelly — Chairman
(Felco Hoists, Ltd.)



M. T. Clayton — Vice-
Chairman (The Clayton
Crane & Hoist Co., Ltd.)



K. B. Warwick (Geo. W.
King, Ltd.)



V. Pepper (Herbert Morris,
Ltd.)



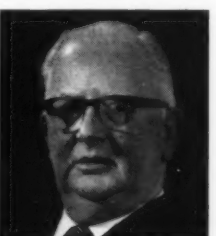
J. Guest (John Barns-
ley & Sons, Ltd.)



A. Langford (The Yale &
Towne Manufacturing Co.)



W. J. Norton (Fellows
Bros., Ltd.)



E. Russell — Past Chairman
(Herbert Norris, Ltd.)



F. J. Winfield — Secretary

The Third Mechanical Handling Gala Ball

One of the highlights during the run of the Mechanical Handling Exhibition was the Third Gala Ball, which was held at the Dorchester Hotel, Park Lane. It was agreed by all who attended that it was a first-class success.



Mrs. J. R. Sharp (left) and Mr. J. R. Sharp (extreme right) (Lansing Bagnall, Ltd.), with a friend at the reception



The M.G.K. Engineering Co., Ltd., party. Seated centre is F. Ketelbey



The Conveyancer Fork Truck Co., Ltd., party. Centre: C. W. Sharp, Managing Director of that company

Mrs. Naden and Mr. J. H. Naden (Power Jacks, Ltd.)



*The Steel Engineering Co., Ltd., party.
Back row, left: R. L. E. Keates, Home Sales Director*



Cocktail Party

On Monday, May 9th, during the run of the Mechanical Handling Exhibition, a Cocktail Party was given by the Organisers to representatives from the Exhibitors and the following are a few of the groups:—



Left to right: S. W. P. Whewey (Whewey, Watson & McLean, Ltd.); L. Tichelly (Felco Hoists, Ltd.); J. T. Wilcox (Felco (Crawley), Ltd.); A. Moreau (Felco France); B. J. McCarthy (Felco Hoists, Ltd.)



Left to right: C. E. Wallis (Chairman and Managing Director, Associated Iliffe Press); Brian Neal (R. H. Neal & Co., Ltd.); W. Picton (International Combustion Products, Ltd., President of the M.H.E.A.)



Left to right: N. Jenkinson (Babcock & Wilcox, Ltd.); H. S. Pocock (Director of Iliffe & Sons, Ltd.); H. A. Collman (Manager, Mechanical Handling Exhibition); F. S. Stent (Babcock & Wilcox, Ltd.)



Left to right: Philip Gough ('Mechanical Handling' Birmingham Office); W. E. Phipps (Coventry Climax Engines, Ltd.); R. P. Lister (Coventry Climax Engines, Ltd.); R. Barnfield (Mercury Truck & Tractor Co., Ltd.)



Derek Page (Press Officer, Mechanical Handling Exhibition); C. E. Parnall (Technical Editor, 'Mechanical Handling'); L. R. Wilson (Conveyancer Fork Trucks, Ltd.)

Institute of Materials Handling Dinner

SOME 200 members and their guests attended the seventh Annual dinner of the Institute of Materials Handling held on May 6th at Dunster House in the City of London. Mr. Charles Remfry, the retiring National Chairman of the Institute, was in the Chair, supported by Mr. H. A. Dixon, the National Chairman Elect. The principal guest was the Right Hon. Viscount Simon, C.M.G., Chairman of the Port of London Authority and Vice-President of the Dock and Harbour Authorities Association.

In proposing the health of the Institute, Lord Simon stressed the importance of the work it was doing. He said that it was still true to say that in the United Kingdom we lived mainly by the performance of four acts, namely the importing of raw material, its conversion into manufactured

goods, selling these and exporting them. Materials handling played a part in the first, second and fourth of these stages and as someone who had been engaged in the business of transport all his life he knew how very important a factor it was.

Lord Simon did sound a friendly note of warning in drawing the attention of the Institute to the danger in a technique such as materials handling of its exponents coming to regard it as an end in itself. He said that materials handling practitioners must always be careful to remember that their technology was the servant of trade and they should be on their guard against inventing ingenious processes for their own sake. He also suggested that they should be careful not to divorce themselves from other



Mr. H. A. Dixon, the new National Chairman of the Institute of Materials Handling

engineering techniques. He was confident that the Institute would guard against these dangers and would continue in the future to make a valuable contribution to the worlds of transport and the manufacturing industries it served.

In his reply, Mr. Remfry assured Lord Simon that the Institute had the points he made very much in mind. The National Joint Committee on Materials Handling, which existed as a common ground on which the various institutes concerned with materials handling could meet, had in fact been sponsored by the Institute of Materials Handling in the first place and a member of the Institute was its current Chairman.

He was glad to be able to say that in this and its other fields the Institute was continuing to go from strength to strength. They had held their eighth annual general meeting to-day and in the past year had added a further 389 members net to their number, making a total as at March 31st, 1960, of 1,732 members. This was not bad, he thought, for an Institute only eight years old, composed entirely of individual private members. During the year, the Institute had formed three new divisions and four new sections and, last but not least, they had taken their educational programme to a stage where it was possible for the first examinations for Graduate Membership to be held this very month. They had held their first International Conference at the beginning of the Institute year which had just ended

Lord Simon, Chairman, Port of London Authority, was the guest of honour. On Lord Simon's right is Mr. Charles Remfry, the retiring National Chairman



and were at the moment in the process of finalizing their third international affiliation with a kindred institute abroad.

All this work had been accomplished without impairing the Institute's financial position which was at the moment extremely healthy, and it was therefore with a very happy heart that he could hand over his office to his successor Mr. Harold Dixon.

Mr. Dixon in his turn made reference to the challenge to the Institute presented by the continuing development in materials handling machinery demonstrated by the current Mechanical Handling Exhibition at Earls Court. He said that all this ingenious equipment was valueless without trained technicians to exploit it to the utmost and it was up to the Institute in its educational programme to help to produce the personnel needed. The Institute must do everything it could to further increase its membership and he appealed to every member to introduce at least one appropriate additional member during the coming year, preferably drawn from the ranks of the users.

Mr. Dixon referred to the second International Conference scheduled to take place at Southport in May, 1961. He said how important it was for the Institute to develop its international contacts and expressed the hope that this would lead to exchanges of apprentices and handling students between various countries in the future.

In proposing the health of the Visitors, Mr. Derek Pascall, the junior Vice-Chairman of the Institute, reminded the gathering that immediately before coming to Dunster House as the guest of the Institute it had been Lord Simon's pleasant duty to ensure the safe embarkation on the *Britannia* of Princess Margaret and her husband.

In a delightfully witty reply, Mr. R. G. K. Way, C.B., C.B.E., J.P., Permanent Under-Secretary of State for War, referred to the great interest of the War Office in materials handling, as after British Railways it was the largest holder of stores in the Commonwealth. Mr. Way also mentioned the happy co-operation which had existed for some years between the Institute of Materials Handling and the Army authorities. For example, the first Convention ever run by the Institute had taken place at Didcot Ordnance Depot.

In the final speech of the evening, Mr. Mackenzie Junner referred to the co-operation between the Institute of Materials Handling and his own Institute, the Institute of Road Transport Engineers. He said that at the very moment the two institutes were working together on a panel whose object was to improve the design of road transport vehicles with a view to the application of improved handling techniques in their loading and unloading.

Mr. D. Pascall, proposing the health of the visitors



Automatic Hardening and Tempering of Carbine Barrel Forgings

Equipment used in the manufacture of small arms must give a high production, be economical in the use of labour and materials and simple in operation. The general streamlining of the armed forces in recent years and the standardisation of a number of weapons amongst the NATO Powers have tended to reinforce these points. High production units have been set up in a number of Ordnance Factories employing the latest techniques and equipment. This has occurred on a large scale at the Royal Ordnance Factory, Fazakerley.

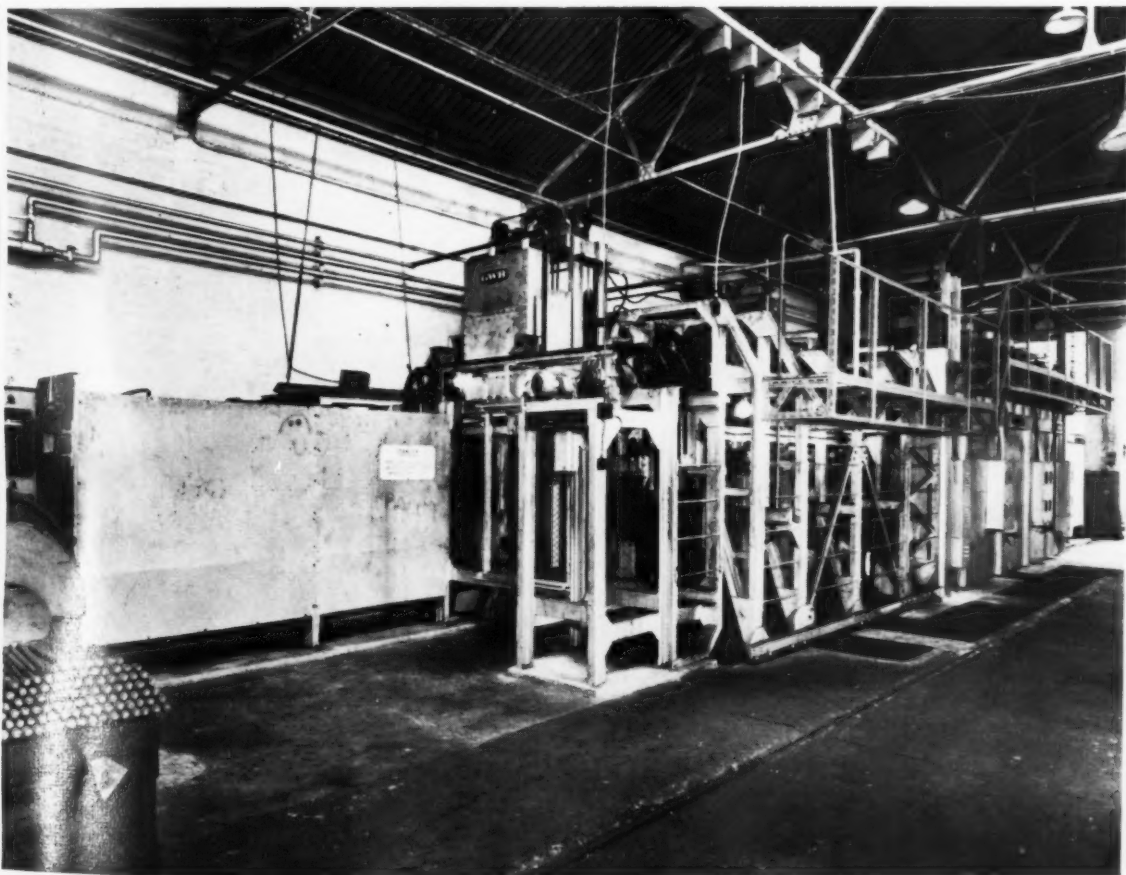
One interesting unit which has been installed there is a fully automatic continuous Hardening and Tempering

Furnace for the treatment of carbine barrel forgings. The unit was designed and built by G.W.B. Furnaces, Ltd.

Previously, barrel forgings had been treated in gas-fired batch furnaces, served by a single traversing charging machine. Hardening, tempering and quenching had been separate operations, each one requiring the use of the charging machine. The forgings had previously been loaded horizontally, and this naturally led to an appreciable percentage suffering some measure of distortion during the heat treatment. This has now been substantially reduced.

The new G.W.B. furnace is almost completely automatic in operation. It requires only one operator to supervise

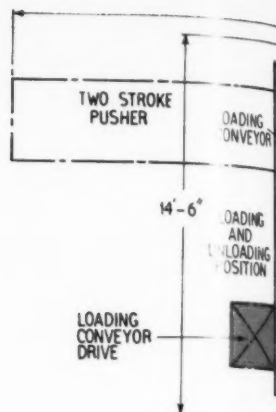
Fig 1. Overall front view of the furnace. On the left is the pusher mechanism into the hardening section, and on the right the tempering furnace line



control, loading and unloading. The different sections of the furnace are linked by conveyors and the separate operations are carried out automatically, thus high productivity is obtained and supervision is reduced to a minimum. Refinements in the actual heat treatment and the use of special suspension jigs for the forgings produce a much better finish, and effect a considerable reduction in the quantity of rejected material. The unit is adaptable in that, if required, the hardening and tempering sections of the furnace can be worked separately and the various sequences can be adapted to suit changing requirements.

The complete G.W.B. installation comprises one Pusher Type Hardening Furnace, with an automatic quench and de-greasing unit, together with a Pusher Type Tempering Furnace, also equipped with quenching and de-greasing plant. Both the quench units are equipped with oil circulating pumps and oil coolers, and a G.W.B. protective atmosphere plant is employed for use with the hardening furnace. These items of equipment are arranged in the form of a 'U', the hardening furnace and its quench tank and de-greaser forming the first leg, the bottom of the 'U' being formed by an electrically driven cross-traversing track, and the other leg by the tempering furnace together with quenching and de-greasing units. A further cross-traversing conveyor links the end of the tempering line with the entry to the hardening furnace.

Barrels are suspended from specially constructed heat resisting jigs, each capable of carrying eight forgings, loading and unloading being effected whilst the carriers are on the final cross-traversing track conveyor. The loading sequence is approximately $7\frac{1}{2}$ min. Forgings to be treated are conveyed automatically under the pivoted head of the

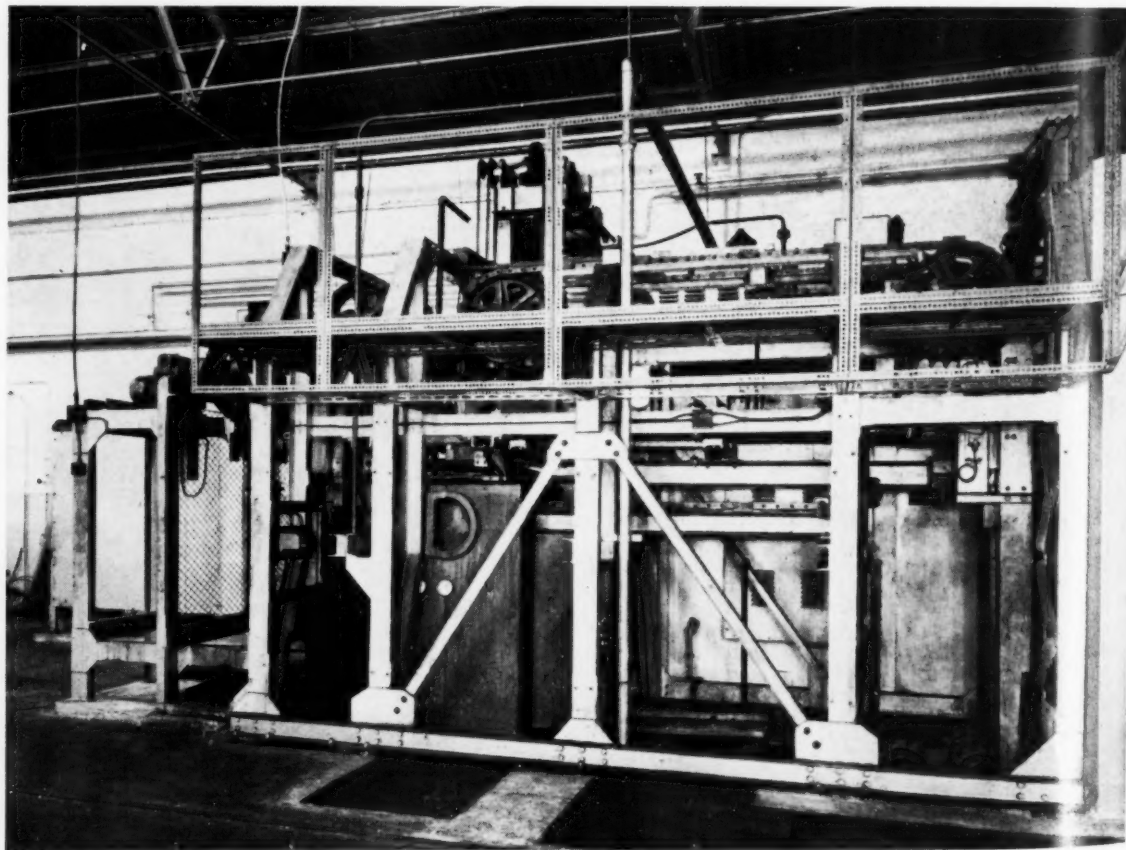


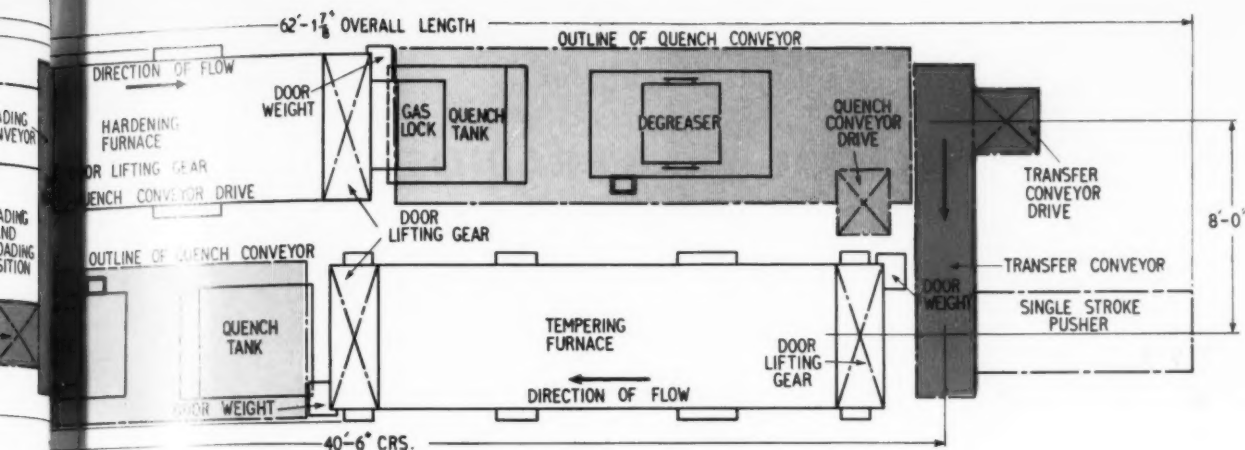
ABOVE

Fig. 3. Block plan of the complete hardening and tempering plant

BELOW

Fig. 2. The end of the tempering line showing the conveyor system into the quench tank, and from the quench tank into the de-greasing unit





hardening furnace hydraulic pusher which is of overhead mounted design. This pusher conveys the carriers separately into the hardening furnaces. The effective dimensions of the hardening furnace are heated length 13 ft 4 in, width 9 in, height 3 ft 3 in. A rating of 120 kW is included in two independent automatically controlled zones, giving a maximum temperature of 900 deg C. Normal operating temperature is 850 deg C, with soaking times of 1 to 1½ hr. The unit was designed for a nominal consumption of 73 kW/hr at 850 deg C. Robustly constructed with a gas-tight casing, the furnace is well insulated to minimize body losses. Two rows of heat resisting skid rails support the charge carriers during their passage through the furnace. Heavy section 80/20 nickel-chromium strip heating elements are arranged on the side walls of the chamber, supported by a special hook suspension method. At each end of the furnace is an electrically operated fully insulated counter-balanced door. Fitted to the base of the entrance door is a unit section of skid rails used for alignment purposes during charging operations.

A gas-lock chamber is situated at the entrance of the hardening furnace, while at the exit is fitted a gas-tight quenching hood, the bottom edges of which are immersed below the level of the quenching medium. In addition to preserving the protective atmosphere, the quenching hood also ensures that the charge ready for immersion is completely free from the cooling effect of draughts, and tends to produce constant uniform quenching temperature.

As the pusher propels the carriers through the furnace, an extractor gear is timed to remove the carrier from the furnace chamber on to the platform of a quenching hoist. The extractor gear comprises a steel frame sited immediately above the quench tank, and the extractor head is provided with a pivoted pawl.

The Quench Conveyor

Immediately the extractor gear has removed the charge carrier from the furnace and deposited it on the quench hoist platform, the platform automatically lowers and places the carrier on to the quench conveyor, which conveys the charge through the quenching medium and also through the de-greasing unit. The approximate dimensions of the quench tank are 10 ft long × 3 ft 3 in wide × 4 ft deep.

In the gas-heated de-greasing unit the barrels are sprayed from a battery of fixed jets which are supplied with de-greasing solution from a motorized pumping unit. In the

base of the de-greaser is situated a gas-heated coil which controls the temperature of the solution by means of a 4-in dial thermometer.

A further extractor gear, similar in construction to that previously mentioned, removes the charge carrier from the quench conveyor and transfers it on to a traversing conveyor; by this arrangement, the charge carriers are conveyed into the tempering furnace line. The traversing conveyor is fitted with tee section attachments to accommodate charge carriers. On reaching the tempering furnace line, the charge carrier is pushed from the traversing conveyor into the tempering furnace by a second pusher gear. The effective dimensions of the tempering furnace are heated length 20 ft, width 9 in, height 3 ft 3 in. With a rating of 90 kW in three independent automatically controlled zones, the unit has a maximum temperature of 650 deg C. Generally, the tempering furnace is similar in construction to the hardening unit, but since no protective atmosphere is employed, the fittings connected with this process are not present. Different types of forgings are soaked for periods ranging from 1½ to 3 hr at temperatures up to 650 deg C. Since these treatments are in the lower temperature ranges, some form of air circulation is necessary to provide efficient distribution of the heat. To this effect, four air circulating fans are situated in the furnace roof, and baffles of heat resisting alloy are specially situated to give directional air flow over the heating elements and through the working space.

Quenching and de-greasing arrangements, together with the extractor and conveyor systems, are similar to those in the hardening furnace line so that a continuous conveyor system is formed, linking all operations.

Each of the furnaces is provided with its own set of electrical equipment, all of G.W.B. manufacture. The switchgear comprises two iron-clad contactor cubicles, one for each furnace, and a totally enclosed motor panel housing 60 motor contactors for the various pusher, extractor, hoist and conveyor drives. Automatic temperature control for both furnaces is provided by a common instrument control panel. A complete sequence of operations for the installation is carried out automatically, and all the necessary limit switches and similar interlocks are controlled from a master sequence time switch in the instrument control panel. The protective atmosphere plant is a standard G.W.B. Burnt Town's Gas Exothermic Unit having a capacity of 1,000 cu. ft./hr, and linked with a G.W.B. silica gel gas drying plant.

THE LANSING BAGNALL 'RAPIDE'

by the Technical Editor



Fig. 1. The Rapide is an 'all condition' truck built for operation under arduous outdoor conditions as well as for indoor work

A PARTICULARLY useful and outstanding addition in the form of a four-wheeled electric general service fork truck has now been made to the already extensive range of trucks by Lansing Bagnall, Ltd. Designated FOER5 (Rapide), it is of robust unit construction, incorporating a number of special features, and has an outstanding road speed with high acceleration. Two models are offered: the FOER5/20 which has a capacity of 2,000 lb, and the FOER5/30 with a capacity of 3,000 lb, both at 24-in load centres.

The excellent performance of this truck has been made possible to a certain extent by the use of the new Exide Ironclad Gauntlet battery, which it is claimed gives 35 per cent more power in the same space over that of previous Exide types. The truck has been designed as a general-purpose vehicle for service under arduous conditions and it is capable of operating outdoors on soft, uneven ground. It is equally suitable for indoor work, where it can operate in 10 ft wide aisles with a turning radius of 67 in for the largest truck. It is said to be able to take an ice-covered 1 in 10 gradient with ease and during a demonstration it made a standing start on a 1 in 5 gradient without any difficulty whatever.

Chassis. This is a robust open-type fabricated structure 37½ in wide with the main load reaction members triangulated to give strength and provide easy access to components.

The low height of the chassis is particularly noticeable, resulting in a low centre of gravity for the complete truck.

Drive Axle. Drive is on the front wheels and is taken direct from the traction motor through a short shaft and universal couplings to double reduction gearing housed in the heavy-duty axle casing. Primary reduction is by helical gears and the final drive gearing is by spiral bevel to the differential. The overall reduction is 10.45 to 1.

The axle is of the fully floating type with taper roller bearings throughout and can easily be dropped from the chassis for maintenance by simply removing two retaining caps and disconnecting the coupling and brakes.

Steering. This is on the rear wheels. A heavy-duty axle beam casting is featured which is centrally pivoted on rubber bushings and fully articulated for operation under rough ground conditions. This axle can also be easily removed for maintenance after taking off the tail weight which is held in position by four bolts.

A re-circulating ball-type steering gearbox is fitted which operates through a split drag link system to track rods. A particularly wide angle lock is provided by this method.

Wheels. An unusual feature on this truck is that the wheel rim and brake hub is combined in one section, which has helped to keep the overall width of the truck down to a minimum. There is a choice of cushion or pneumatic tyres; when pneumatics are fitted 7 × 9 in are used for the front wheels and 18 × 7 for the rear.

Electrics. A 48-volt battery is fitted, divided into two sections each of 24 volts. As mentioned previously, it is of the Exide Ironclad Gauntlet type and there is a choice of either the IMF 17, 301 A/H type or the ILF 17, 387 A/H on the 2,000 capacity truck. On the 3,000 lb only the ILF 17 is fitted. The battery is mounted in a steel container which is provided with lugs either side for lifting purposes. The battery with its container drops into the top of the chassis where it is located by dowels and it is provided with a glass fibre hinged cover which also provides a mounting for the driving seat. To lift the battery from the truck it is only necessary to take off the glass fibre cover which is provided with a quick-release attachment. There are no holding-down bolts fixing the battery.

The traction motor is a totally enclosed compound wound type with a 1-hour rating of 10 h.p. at 1,400 r.p.m. to B.S. 1727/1952. It is provided with a split series field winding which is used for traction duty, a shunt winding provides for rheostatic braking. The traction motor is located on rubber mountings within the triangulated members on the chassis. It is readily accessible for maintenance if the battery is lifted.

All control switches and contactors are grouped together as one unit which is mounted within a space provided for the purpose between the chassis members and can be removed after taking out two bolts. It is located beneath the driver's footplate and protected by a hinged cover which is easily removable. Access to the components making up the control unit is therefore a simple matter and is another indication of the careful thought that has been given to the matter of



2

Fig. 2. Showing the main load reaction members which are triangulated to form an open chassis



3



4

Fig. 3. This view gives a good impression of the heavy-duty rear axle beam casting and the wide angle lock provided

Fig. 4. The traction motor is rubber mounted within the main load reaction members of the chassis

Fig. 5. The hydraulic pump motor unit is mounted on the front scuttle for easy maintenance

Fig. 6. The electrical control unit is housed beneath a hinged cover located underneath the driver's footplate



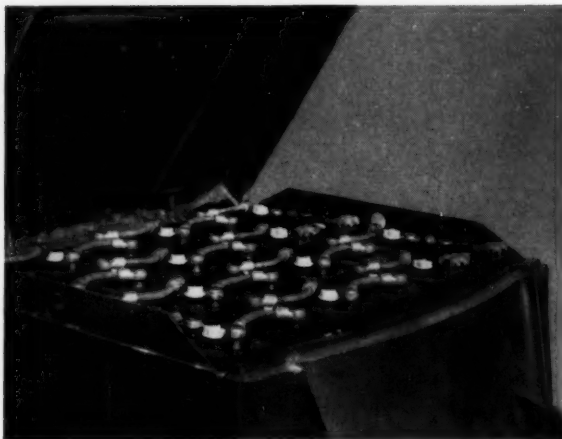
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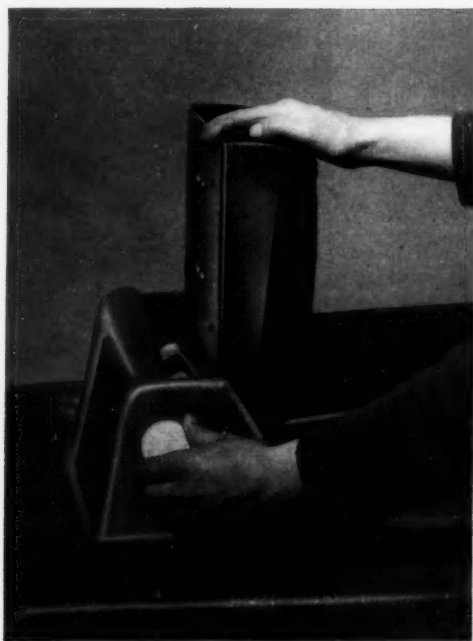
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7



8



9

maintenance on the FOER5.

Although an exceptionally high rate of acceleration is a special feature on this truck, it is very smooth in operation. This is obtained by the use of a dashpot filled with silicon fluid which determines the rate of microswitching actuated by the accelerator pedal. The dashpot can be adjusted to suit particular working conditions; it is unaffected by climatic conditions and is leakproof.

The controller switches energize contactor coils to give six-speed steps both forward and reverse. Variation in speed is obtained partly by armature resistance steps but mainly by series-paralleling the battery sections and also the field sections in such a way that 24 volts is applied to the motor at the lower speeds and 48 volts on the higher speeds. By this method a great deal of the energy is saved which would otherwise be wasted in starting resistances. The size and therefore the space occupied by the resistance is also greatly reduced.

Under heavy load conditions when maximum motor torque is required a torque actuating switch ensures that full motor field is used to enable the duty to be performed at maximum motor efficiency. With no pressure on the accelerator pedal, rheostatic braking comes into operation which assists in halting the truck on the level, or in controlling the speed during descent of a gradient.

In order to eliminate the possibility of damage to motor or transmission provision is made for plugging the traction motor on the first two steps only.

Hydraulics. Power for the hydraulic system is supplied by a totally enclosed series wound-type motor with a $\frac{1}{4}$ of an hour rating of 6.3 h.p. at 3,300 r.p.m. to B.S. 1727/1956. The motor is coupled direct to a Plessey gear pump and the complete pump motor unit is located behind the front scuttle. This is conveniently placed so that it can be inspected and maintained without removing it from its mounting.

The hydraulic system is controlled through a bank of valves located in an easily accessible position on the front scuttle. Provision is made for four valves but normally the truck uses only two for lift and tilt, the remaining two being available for attachments.

An overload relief valve is incorporated in the control valve assembly and is set at 2,400 lb/sq. in.

All hydraulic cylinders are of drawn steel tube with honed bores. The lift jack is fitted with fluon seals and nylon bearings, and the tilt jack has fabricated rubber-backed seals effective at all pressures from 0 up to 10,000 lb/sq. in. A three-gallon capacity hydraulic tank is built into the scuttle and located above the hydraulic pump motor unit. It is fitted with a micron filter with a replaceable element and a mesh filter is fitted to the suction line from the tank to pump. Working oil pressures in various parts of the system are from 400 up to 2,200 lb/sq. in.

In order to eliminate flow dividers, etc., and so simplify the hydraulic system the tilt jack is of a particularly large diameter.

Brakes. Foot-pedal controlled 10 x 1 $\frac{1}{4}$ -in hydraulic brakes are provided for the front wheels. The hand brake also operates on the same front wheel brake drums and on the low-speed stages there is rheostatic braking.

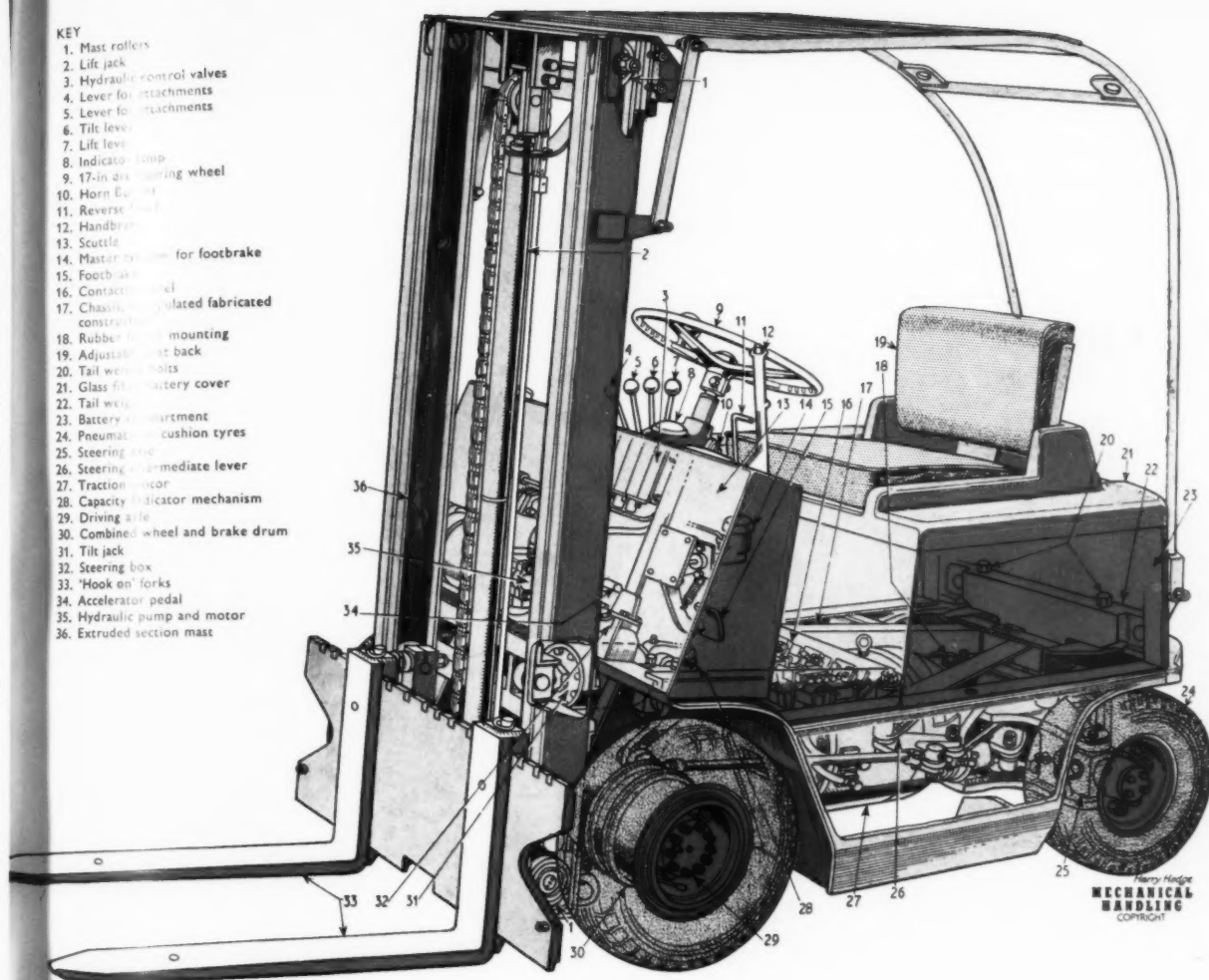
Fig. 7. To simplify hydraulics a particularly large-diameter jack is employed

Fig. 8. The 48-volt new-type battery is fitted with a 'quick-release' hinged glass fibre cover

Fig. 9. Showing the simple four-position adjustment to the back of the driving seat

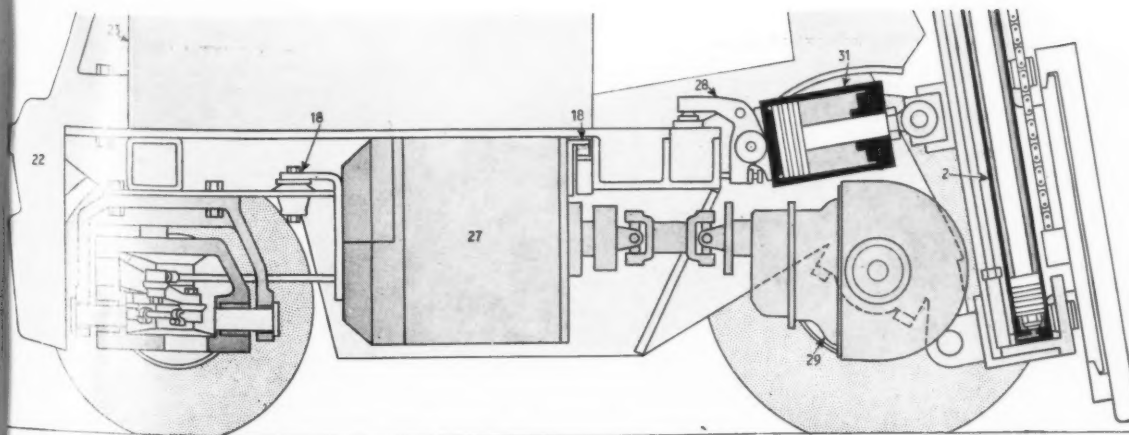
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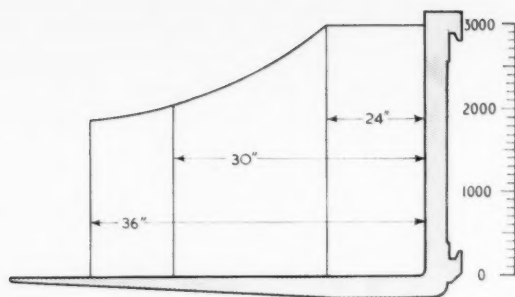
1. Mast rollers
2. Lift jack
3. Hydraulic control valves
4. Lever for attachments
5. Lever for attachments
6. Tilt lever
7. Lift lever
8. Indicator lamp
9. 17-in. diameter wheel
10. Horn button
11. Reverse lever
12. Handbrake
13. Scuttle
14. Master cylinder for footbrake
15. Footbrake
16. Contact switch
17. Chassis, regulated fabricated construction
18. Rubber foot mounting
19. Adjustable seat back
20. Tail wheel bolts
21. Glass fibre battery cover
22. Tail wheel
23. Battery compartment
24. Pneumatic cushion tyres
25. Steering axle
26. Steering intermediate lever
27. Traction motor
28. Capacity indicator mechanism
29. Driving axle
30. Combined wheel and brake drum
31. Tilt jack
32. Steering box
33. "Hook on" forks
34. Accelerator pedal
35. Hydraulic pump and motor
36. Extruded section mast



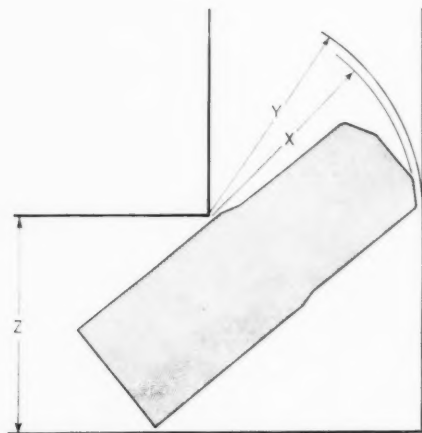
ABOVE
Fig. 10. Artist's impression of the Lansing Bagnall FOER 5 fork truck, with key

BELOW
Fig. 11. Part-section showing traction motor, transmission, tilt and lift jack





ABOVE
Fig. 12. Rated maximum loading for load centres of 24, 30 and 36 in on the FOER 5/30



ABOVE
Fig. 13. Diagram showing the minimum space requirements for the FOER 5

	FOER 5/20	FOER 5/30
X Radius of outside turning circle	64 in	67 in
Y Width of equal intersecting aisles	68 in	72 in
Z Width of aisle for 90 deg stacking	120 in	123 in

RIGHT
Fig. 14. Overall dimensions for the FOER 5/20 and /30

DIMENSIONS (Fig. 14)

	FOER 5/20	FOER 5/30
A Overall width (pneumatic tyres)	40 in (1,016 mm)	40 in (1,016 mm)
B Body width	37½ in (953 mm)	37½ in (953 mm)
C Forks max. spread	36 in (915 mm)	36 in (915 mm)
D Height with forks lowered	83 in (2,108 mm)	83 in (2,108 mm)
E Stacking height	120 in (3,048 mm)	120 in (3,048 mm)
F Wheelbase	45 in (1,143 mm)	48 in (1,219 mm)
G	12 in (305 mm)	12 in (305 mm)
H	15¾ in (400 mm)	15¾ in (400 mm)
J	5 in	5 in
K	4 in	4 in
	57 in (1,447 mm)	57 in (1,447 mm)
Seat height (with large capacity battery)	41 in (1,041 mm)	41 in (1,041 mm)
N Fork length (standard)	42 in (1,067 mm)	42 in (1,067 mm)
O Back tilt	10 deg	10 deg
P Forward tilt	3 deg	3 deg

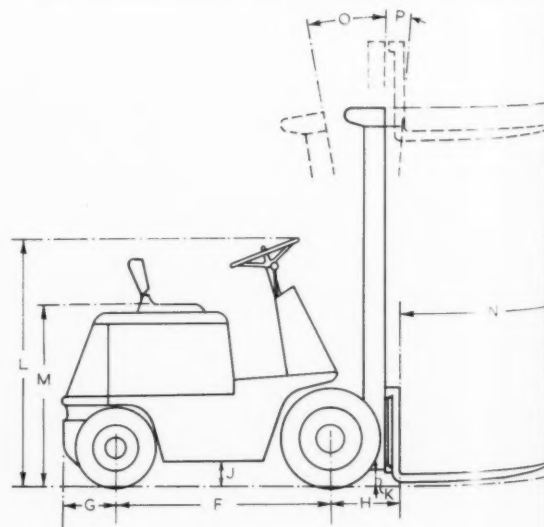
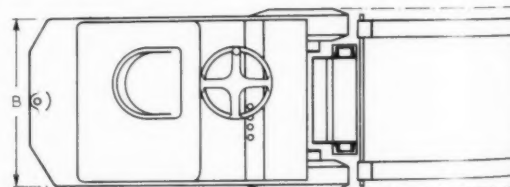
Mast and Forks. This is of the twin-telescopic type and is made from extruded channel section material. A feature of note is that the inner section which measures $5 \times 1\frac{1}{2}$ in is provided with an additional $1\frac{1}{8} \times \frac{5}{8}$ in flange protruding from the heel. This gives additional strength and also enables the rollers to retain their maximum centres at every position of the mast, so ensuring extreme rigidity and elimination of movement in all directions. The complete mast is removed quite simply by taking out two pin pins and disconnecting the tilt jack.

A single-plate link chain raises the fork carriage which has a breaking load of 22,400 lb. This gives a safety factor of 6.5-1 on the 3,000-lb machine and 9-1 on the 2,000-lb machine.

'Hook on' type forks 40 in long are fitted as standard and measure $3 \times 1\frac{1}{2}$ in section for the 2,000-lb truck and $4 \times 1\frac{1}{2}$ in for the 3,000 lb. Other sizes of forks can be supplied as required.

Driver's Controls. These follow normal industrial truck practice with foot-operated accelerator and brake pedals, hand-operated parking brake lever and a 17-in dia steering wheel. Hydraulic control levers are grouped alongside the steering wheel with a forward and reverse lever positioned near to the hand brake and for operation by the driver's left hand. On the dash panel is located a capacity indicator and a large diameter indicator light, this red light remains on whenever the master switch of the vehicle is on and the vehicle is stationary; it has been made particularly large as a safety measure so that it may be seen from a distance as well as from the driver's position. A horn button is located in such a position that it can be operated by the driver's right knee.

A comfortably sprung driver's seat has a back which is adjustable in four positions by a simple but effective mechanism.



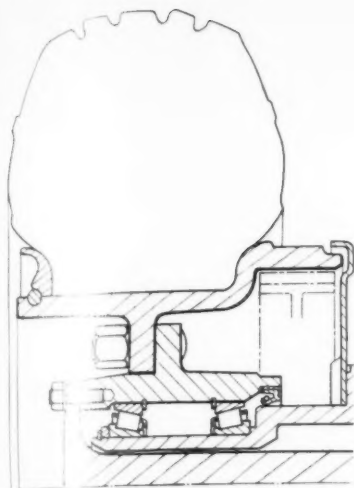
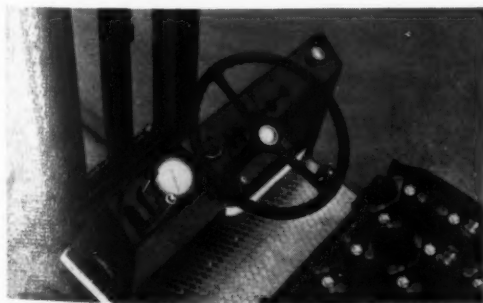


Fig. 15. Section through the combined wheel hub and brake drum

The general specification of the Lansing Bagnall FOER5 is as follows:—

	FOER5/20	FOER5/30
Capacity	2,000 lb @ 24 in centres (907 kg @ 610 mm centres)	3,000 lb @ 24 in centres (1,361 kg @ 610 mm centres)
Turning radius	64 in (1,626 mm)	67 in (1,702 mm)
Chassis width	37½ in (940 mm)	37½ in (940 mm)
Width over pneumatic front tyres	40 in (1,016 mm)	40 in (1,016 mm)
Length excluding forks	72½ in (1,848 mm)	75½ in (1,926 mm)
Back tilt	10 deg	10 deg
Front tilt	3 deg	3 deg
Stacking height	120 in (3,048 mm)	120 in (3,048 mm)
Max. speed (unladen)	13 m.p.h. (21 km.p.h.)	12 m.p.h. (20 km.p.h.)
Lift speed (laden)	50 ft (15.24 m) p.m.	33 ft (10 m) p.m.
Lift speed (unladen)	60 ft (18.3 m) p.m.	60 ft (18.3 m) p.m.
Height with forks lowered	83 in (2,108 mm)	83 in (2,108 mm)
Wheelbase	45 in (1,143 mm)	48 in (1,220 mm)
Total weight with battery	5,000 lb (2,268 kg)	6,000 lb (2,722 kg)
Total weight without battery	3,500 lb (1,587 kg)	4,200 lb (1,905 kg)

Fig. 18. View showing the neat arrangement of controls and indicators. The battery cover with driving seat has been removed



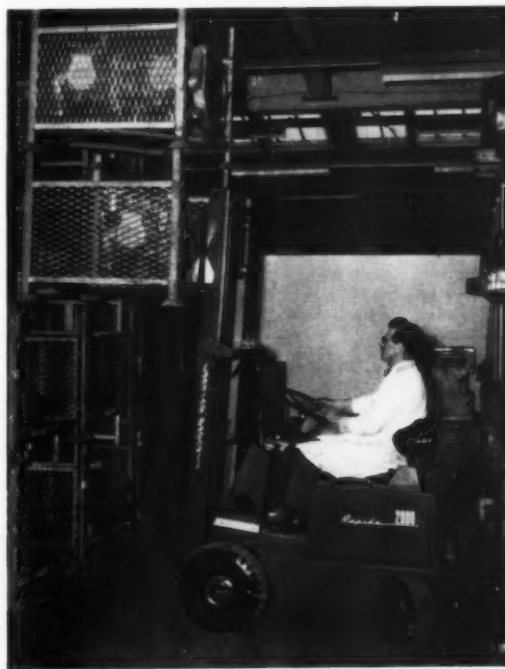
Attachments. Any items of equipment from the extensive range of 'Cascade' attachments suitable to the capacity of the truck can be fitted. A four-lamp set of road lights with a spotlight for the mast is available for night working. There is also a tilt indicator and a choice of several types of battery chargers from the standard Lansing Bagnall range.

Protection for the driver in the form of an overhead guard made of heavy-gauge steel tube and wire mesh as shown in Fig. 10 can also be supplied.



Fig. 16 (above). The Rapide 2000 undergoing trials loaded and on a steep rough gradient

Fig. 17 (below). Showing the ability of the truck to manoeuvre within narrow gangways



An Electro-Hydraulic Tail Lift

It is emphasized that this new equipment is essentially a tail-board lift intended for use with back-door box-type vehicles with no tail-board, as distinct from the normal type of tail-board lift which when fitted to the box-type vehicle has to be moved out of the way before the doors can be opened. Under Pat. App. No. 36308/57. It has been developed by A. & C. Jenner, Ltd., who hold the manufacturing rights for the world except for Belgium, Germany and France, for Philips Electrical Industries, Ltd.

The need for such a tail lift was determined by London Carriers, Ltd., who are 'C' licence operators for Philips Electrical Industries, Ltd., and who have a fleet consisting of some 320 vehicles which are used entirely to handle the transport and delivery of the parent company's electrical and electronic equipment. A handling problem occurred when deliveries of bulky items were being made to retail shops and the driver had to handle these loads from lorry to ground level. The problem became more acute when London Carriers, Ltd., were called upon to handle some of the many lines of delicate electronic equipment such as X-ray equipment, welding machines, etc., which could not be handled by one man.

The tail lift described in the following has now been in operation on vehicles owned by London Carriers, Ltd., for over 6 months, and has proved most satisfactory. Two basic types of tail lift have been introduced. Where a vehicle with high clearance beneath the chassis frame is used a simple form of the unit is fitted which flattens 'up' under the chassis in one operation. Where clearance is limited a similar procedure is followed but the unit is mounted on rollers which entails a second operation in pushing the unit back between the chassis members.

Fig. 1. Controls are simple and conveniently placed

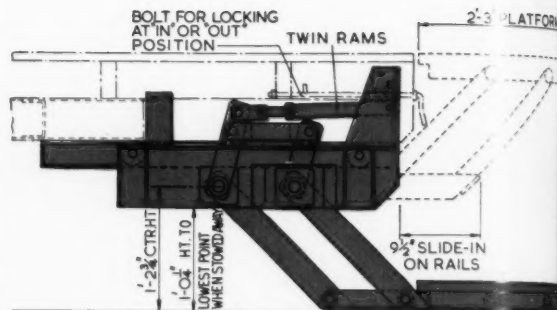
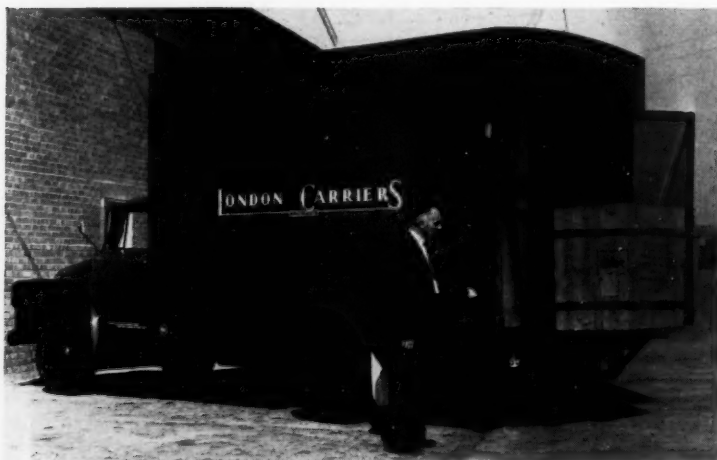


Fig. 2. Diagram showing the operation of a Tail Lift as fitted to the Bedford J2L type chassis with 143 in wheelbase

Power is supplied by a Smith's 12 volt electro-hydraulic unit which is very compact and can be mounted within any convenient distance of the tail lift. Twin power jack rams are fitted one either side of the tail-lift mechanism and operation is by a single press-button start switch for the motor and the customary hydraulic control valve. There are two micro-limit switches, one to control the maximum lift position, and the second is connected in the ignition circuit of the engine, so that the engine of the vehicle cannot be operated unless the tail lift is retracted and locked into position. In the case of a diesel engine the switch is arranged to interrupt the fuel flow to the injection pump. The micro-switches operate on both the upward and downward movement of the lift so that the engine is automatically cut out in the unlikely event of movement taking place in the lift while the vehicle is in motion.

Lifting capacity is 6 cwt, and a load can be raised from ground level in about 12 seconds, with maximum load. The total weight of the largest unit is about 3 cwt.

It is necessary for the lift to be adapted for fitment to various types of vehicles and while many of the parts are standard a number of parts have to be made specially according to the type of vehicle involved. The price of the unit therefore depends to a great extent upon the type of vehicle for which it is required.

The lift is brought into operation in under one minute by first releasing a lock by means of a hand lever and operating the hydraulic valve so that the lift drops to the ground under its own weight. In the case of a roller-type unit, it is necessary to pull the unit from the chassis frame before releasing the hydraulic valve.

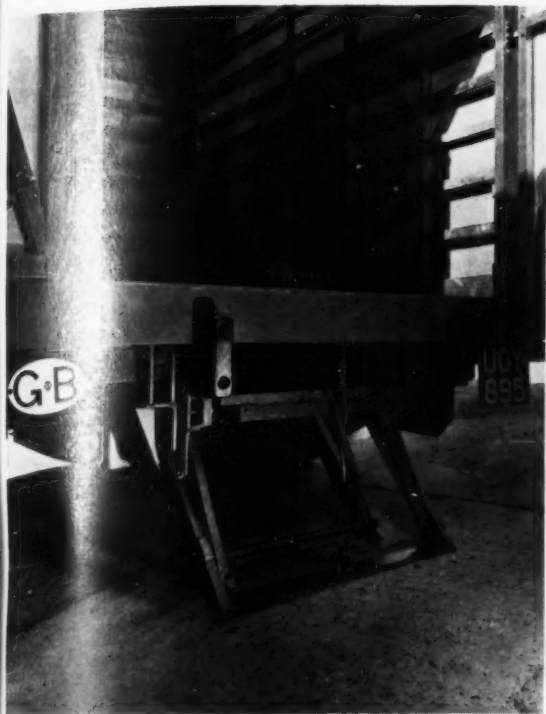


Fig. 3. Frame of lift lowered to ground with platform hinged back ready for stowing



Fig. 4. Platform at ground level showing low ground clearance

Fig. 5. The lift in the process of raising a load. It can be stopped and locked in any intermediate position

Fig. 6. Showing the compact arrangement of the lift in its 'stowed away' position, no part extending beyond the back of the vehicle



When the lift has reached ground level, the platform is unfolded into a horizontal position and the lift is ready for use. The lift can be stopped and locked at any intermediate position on the upward or downward movement, to enable the goods to be handled to or from a loading platform or truck.

The lift is stowed away by first folding back the platform then raising it to its folded position by operation of the motor. A limit switch controls this position and the lift is either then locked or in the case of the roller type, pushed into the chassis and locked into position.

When the lift is used only for awkward loads which usually constitute a relatively small percentage of the total number of items as is the case with the fleet of vehicles owned by London Carriers, Ltd., the vehicle's battery can be used to power the electro-hydraulic unit because no undue load will be placed upon the battery. If, however, the tail lift is to be used frequently a separate battery for powering the hydraulic unit is advised.

FLEXIBLE AND SAFE ELECTRICAL POWER DISTRIBUTION

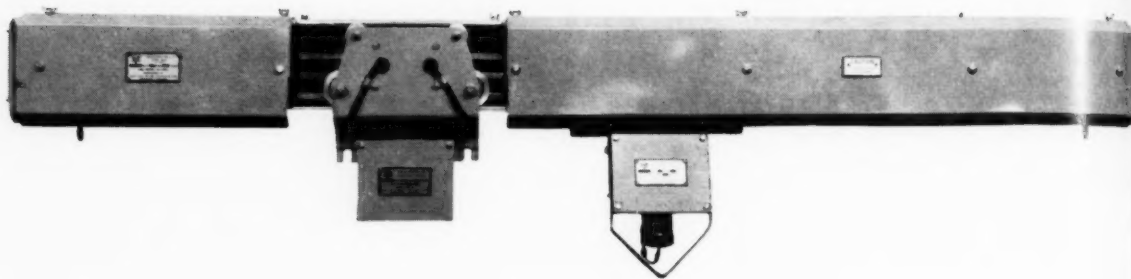


Fig. 1. General view showing a trolley fitted with fuse box and trolley with plug and socket

THE ever-increasing application of electrical power within industry has brought with it problems of ensuring that the methods of distributing that power are efficient and also safe, both for those actually using it and also for those working within any specified area of operations.

Especially is this so where mobile equipment such as cranes and hoists and portable tool installations are used. It is still all too common to see virtually unprotected supply wires to cranes or long lengths of trailing leads snaking around work areas supplying power to portable electric tools.

The permanent fixed route method of siting electrical conduits, etc., with predetermined power outlets diminishes the degree of possible flexibility in plant layout or production methods. Additions to power outlets demand skilled work—upsetting production schedules and possibly interfering with the actual layout of a shop.

The closely integrated processes of modern production and assembly lines demand that power services should be brought to specific points of application. Further, these points of application may be variable within defined limits, e.g., the setting down of a car body, by overhead hoist, can take place over a distance of several yards as the 'mechanicals' receiving the body move along a floor conveyor.

Thus it is essential that means of distributing electrical power to production or handling equipment are designed to give the greatest flexibility at the point of application, the greatest degree of safety in distributing the actual power and enable the optimum use to be gained from planned floor layouts and modern methods of production.

There are at present numerous methods of insulating electrical conductor wires but a large number of these are designed merely as additions to the existing power installation.

The Trolley-master enclosed collector track system, designed and manufactured by E.M.S. Electrical Products, Ltd., has the advantage of being the result of a specific study of the problems involved in electrical power distribution and of building into the design a high degree of safety and flexibility under a wide range of applications.

Basically the system is comprised of a body section, the conductor rails and the trolley collector. A number of

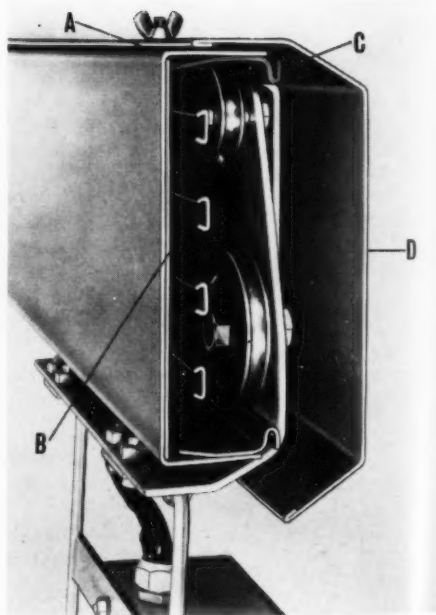


Fig. 2. End view showing trolley in position, with runner strips, special rail section and removable cover. A Body section; B Conductor rails; C Runner sections; D Cover

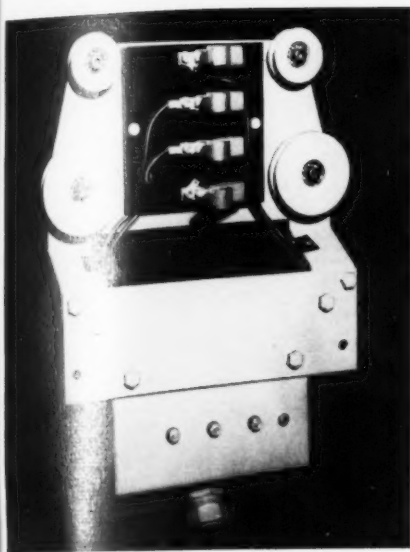


Fig. 3. Towing-type trolley showing rollers and brushgear

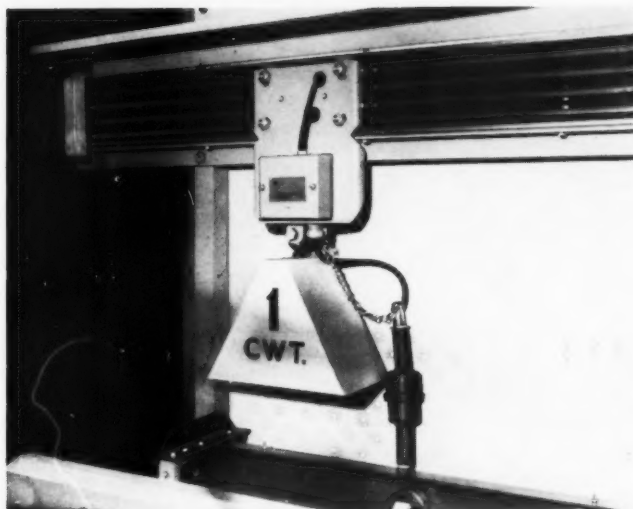


Fig. 4. Demonstration unit of a heavy-duty trolley with inlet socket for Hicycle tool installations



Fig. 5. Method of removing and replacing trolley

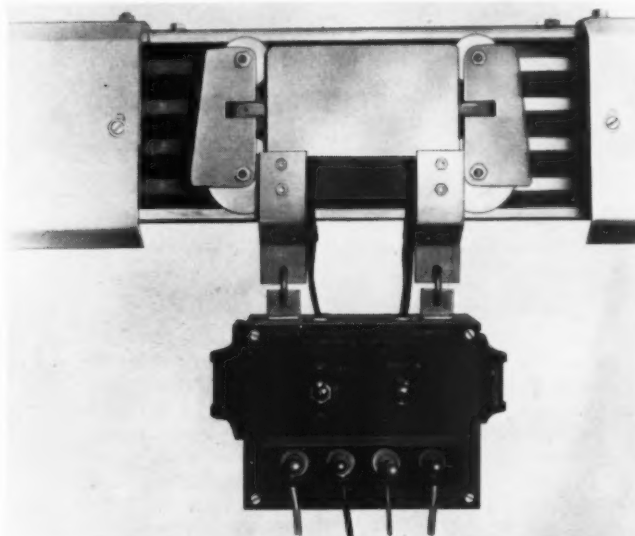


Fig. 6. Duct with cover removed showing trolley (curved type), with test panel for use with conveyors. Any radius curve can be supplied to special order

variations can be made to these basic components according to customer requirement.

Busbars are rated at 100 amps on 400-V 3-phase supply systems. The standard trolley collectors are rated at 20 amps but higher ratings of 40 and 60 amps can be supplied. The 4-bar, 3-phase and earth construction is standard, but the system is suitable for single-phase and earth or 3-phase and neutral and D.C. In addition, multibar assemblies to provide up to 12 conductors in the casing (24 when mounted back-to-back) can be easily arranged.

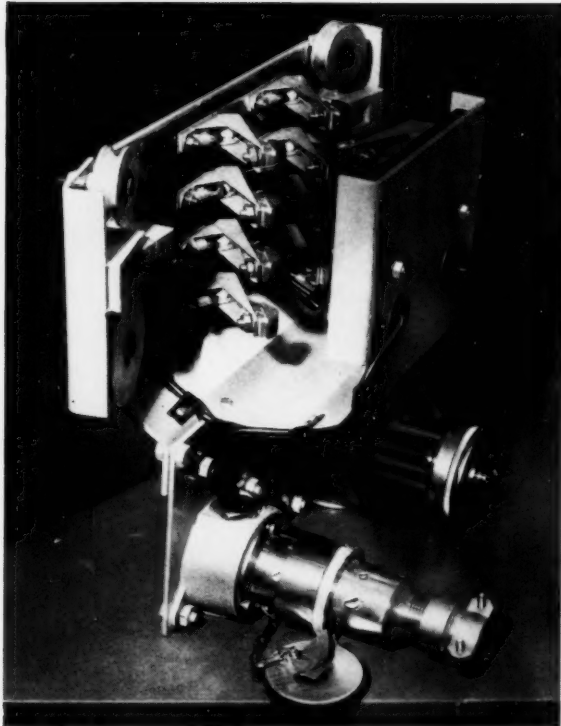
Construction

The method of construction and assembly is simple and robust. The body section is formed of metal channel; in this run the conductor rails supported at intervals on

insulators. Above and below the conductor rails, but still within the main body section, are two runner sections which act as guide rails for the wheels of the trolley collectors. Finally, a special shaped cover encloses the assembly, covering the conductor rails and trolley collector.

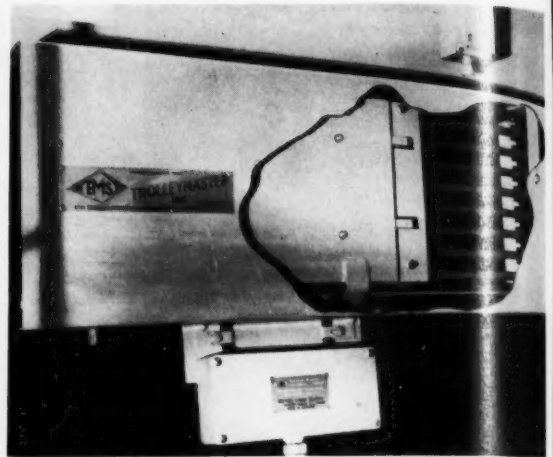
The bottom of this cover is so designed that it forms, in conjunction with the main body, a continuous duct with a slot along its lower length, allowing the electrical distribution point, e.g. fuse box, plugs and socket, to move freely with the trolley collector to which it is attached and at all times readily and safely accessible for normal working. The shaped cover is held in position by wing nuts through the top of the main body section, here it is held safely and rigidly while allowing rapid dismantling for maintenance purposes.

Lengths of ducting are joined by a two-piece wrap around



ABOVE

Fig. 8. Special double trolley for 8-bar track

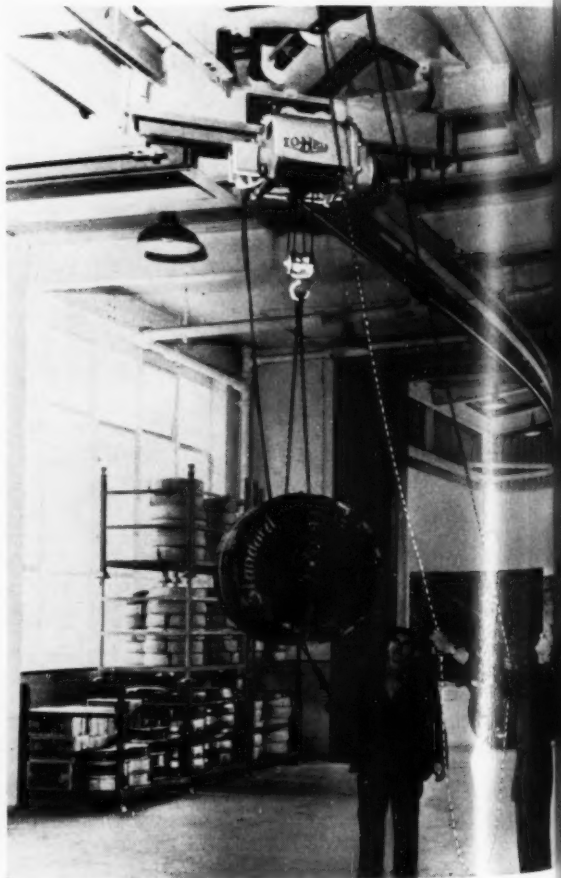


ABOVE

Fig. 7. Special 8-bar construction for the protection of crane cross-span wires and for mechanical handling controls

BELOW

Fig. 9. Trolley-master turntable track used in conjunction with a Lo-Head hoist



joint and these, together with bridging straps holding the runner sections in alignment, ensure an unbroken continuous working assembly. Support brackets can be located at any point along the duct depending on the working site and the nature of the equipment using the distribution trolley.

Trolley Collectors

Two types of trolley collector are offered as standard. The fixed fuse box type for hoist and crane applications is shown at Fig. 3. The other standard type is that designed for Hi-cycle and portable tool installations—this has a hinged fuse box and is shown in Fig. 4.

In either model the actual trolley is of the same construction consisting of a M.S. plate on which four ball bearing rollers are mounted. These rollers engage on the runner sections within the main body of the assembly. Spring-loaded contacts of copper/carbon mounted on the inner surface of the plate are held in direct contact with the conductor rails. This construction can be clearly seen at Fig. 2. The fuse boxes can be fitted with a connector block, re-wireable or H.R.C. fuses.

The insertion and removal of trolleys can be performed quite simply in either of two ways: (1) by removing a blank end from the ducting and running the trolley off the runner sections or, (2), by slackening off two nuts over a short length of the upper runner and sliding the runner strip inwards to clear the trolley wheels. Predetermined trolley

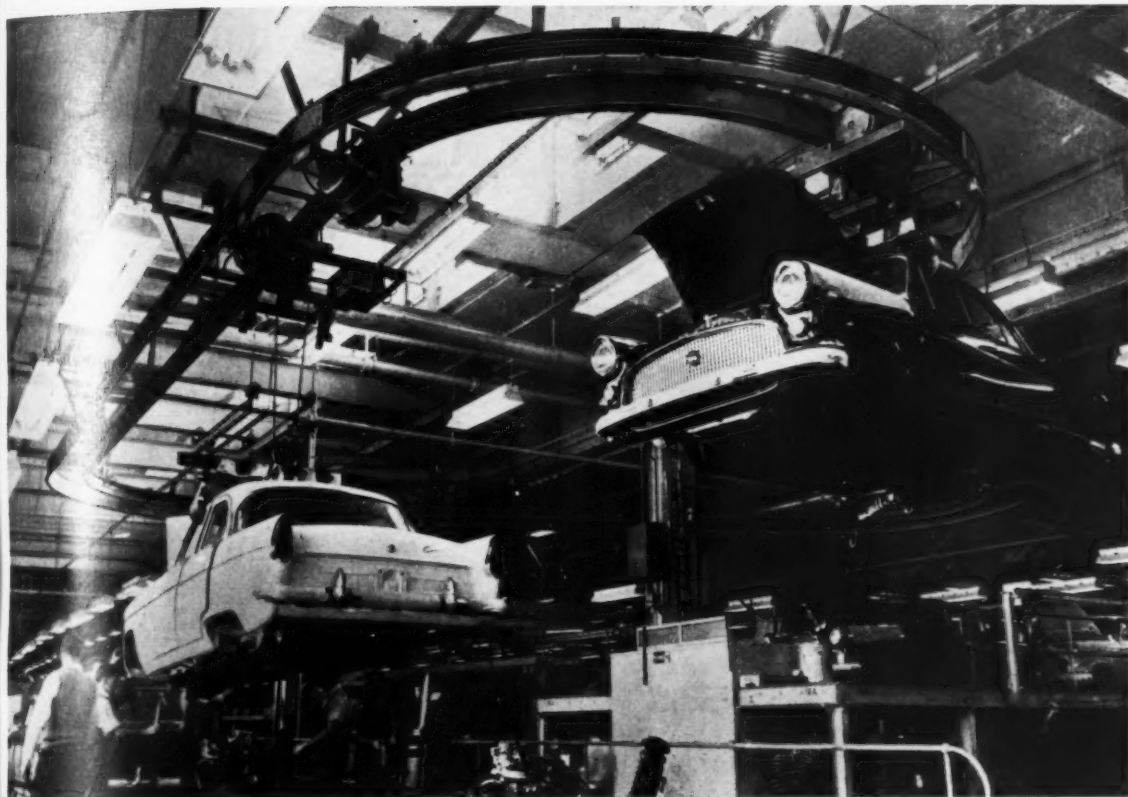


Fig. 10. 7-bar Trolley-master with covers removed on motor car body handling at the Ford Motor Co., Ltd.

insertion points are built within the ducting length to allow for this latter method.

Where the layout of a particular distributive system requires, the ducting can be curved and specially designed trolleys supplied to negotiate the bends; any radius curve can be supplied to special order.

In moving the trolley along the conductor rail it is essential that the connections between the trolley and towing equipment should be flexible—on curved sections this is of great importance. In most applications the recommended method of movement is by short lengths of chain on each side of the fuse box—the chain being attached to protruding arms from the crane or hoist using the trolley and the whole arrangement so devised that the pull is as far as possible directly under the trolley rollers.

A more robust version of the original Trolley-master equipment with conductors suitable for 250 amps and trolleys capable of dealing with mobile power requirements up to 150 amps has now been introduced. At present a 4-bar version only is available, 3-phase and earth. Voltage range up to 600 V A.C. or D.C. Applications envisaged are: 1. Down shop conductors for cranes; 2. Crane cross-span protection, 3. Heavy-duty conveyor and mechanical handling applications.

The general design is based on the 'Trolley-master' 100, but it is more robust and particularly suitable for operation under bad conditions—i.e., outdoor, and in foundries and where rough usage is anticipated. Particular attention has therefore been paid to accessibility—the covers are hinged

and also removable if required, for maintenance. Trolley collectors can be removed for inspection and repair at any point along the track, merely by slackening off two bolts.

Applications

The photographs at Figs. 7, 8 and 9 show various applications and alternative arrangement of the basic 'Trolley-master' equipment.

Of particular interest, a recent application of this Trolley-master guarded collector track was one of several installations at the Ford Motor Co. Body Group Fig. 10. Here, an overhead enclosed circuit of track and R.S.J. Monorail was specially designed to 'deck' car bodies on to their suspensions and engines running on a floor conveyor.

The collector track had to follow a series of bends in the R.S.J. carrying a number of hoists and pusher mechanisms and incorporated automatically energized waiting stations at specified positions on the track. The tracks consist of 4-bar conductors along the whole route and three additional bars at the loading and unloading stations, i.e., a total of seven bars, which have section gaps and ramps for the trolley brushes when required. The trolleys are all of 7-bar construction and are arranged for traversing curves and also to transfer at points where spare hoists are located.

A few of the many applications of the system have been in conjunction with conveyors for the automatic testing of washing machines, refrigerators, etc., guarded power supplies for cranes and hoists, including cross-span protection, portable Hicycle tool installations and certain types of special machine tools, e.g., spar millers and planers.

'Trolley-master' is also being installed in the new P. & O. liner *Canberra* in conjunction with the passenger baggage handling conveyors.

LOG HANDLING AT PULP MILL

ONE OF THE most important recent developments at the Mersey Division of The Bowater Organisation has been the completion, in the spring of 1959, of a groundwood pulp mill. Among the most modern of its kind in Europe, it is the second only in Great Britain, the other being at Bowater's Kemsley Division in Kent. The consumption of the plant is in the region of 2,500 tons of pulpwood a week and many thousands of tons are in store on the stock-piles. Most of the wood being used is home grown and comes from England, North Wales and Scotland.

The problems of conveying and stacking logs in really large quantities is comparatively new to Britain. Yet Mitchell Engineering, Ltd.'s, recently completed external conveyor system at Bowater's Mersey Division handles over 100 tons of logs an hour.

This vast capacity is attained by an arrangement of chain and belt conveyors, 1,250 ft in total length, which carry logs either straight to the pulping mill or to a stock-pile. The logs carried straight to the mill pass through a de-barking plant, and provision is made for re-circulating any log not properly debarked. Logs for storage are carried up a 120-ft mobile stacker to be dropped on to the stockpile.

The log-handling plant has been planned for both home-grown and imported wood. The logs, which are 4 ft in length, vary from 2 to 14 in dia. At present serving four grinders, the home-grown wood section of the handling plant has been completed and provides storage for more than 20,000 tons in two piles.

Wood can be received by road, rail and sea. Trucks or rail wagons are brought alongside a 6-chain conveyor 190 ft long. Here, a mobile mechanical rake unloads the trucks by raking the logs on to a ramp from which they slide into the ground conveyor. Ten tons of logs can be unloaded in 6 min. Logs arriving by rail wagons are unloaded by the same method. Logs arriving by ship are unloaded in slings by the cranes at the wharf and then moved by rail to the storage area.

Running at 50 ft a minute, the ground conveyor discharges 100 tons an hour on to an inclined distributing conveyor, which in turn discharges to a horizontal belt conveyor. From this the logs can be 'ploughed off' at different points to feed the log stacker or the barking drum.

About 150 ft long, 80 ft high, the log stacker conveyor is inclined at an angle of 30 deg. It has two chains running at 200 ft/min and can handle 200 tons of wood an hour. The whole unit is mounted on rails and can travel 260 ft. This allows logs to be temporarily stored in the imported wood area and gives an additional home-grown wood capacity of 8,000 tons.

Of the all-welded Canadian Ingersoll-Rand type, the barking drum is 45 ft long by 12 ft dia. It revolves at $4\frac{1}{2}$ r.p.m. and has an output of 30 tons an hour. The drum can be used on either wet or dry barking.

Logs are taken from the drum outlet on a belt conveyor and 'ploughed' on to a sorting conveyor belt. Accepted logs are shot into hoppers feeding the grinder charging



From the sorting house the accepted logs travel up a conveyor to the log floor where they are fed mechanically into the grinder magazine

conveyor. They are taken from the hoppers one at a time by two chain slot conveyors travelling at 78 ft a minute, carrying the logs crosswise. On reaching the magazine of the grinder, the logs fall through an opening in the bottom of the conveyor. When the magazine is filled, a pneumatically operated gate is closed and the logs pass to the next magazine.

The log bunker stores sufficient wood for 8 hr. This allows the barking drum and all external conveyors to be shut down on the night shift.

A mobile grabbing crane fitted with wide crawler tracks and having a radius of 40 ft grabs one ton of logs at a time. A cross conveyor discharges the logs on to a main reclaiming conveyor which in turn discharges to two chain conveyors feeding the barking drum.

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